OCTOBER
1957

Excavating Engineer

founded 1905

Much of this issue is devoted to *Excavating Engineer*'s visit to the Canadian side of the St. Lawrence Seaway project. Articles on Seaway jobs begin on page 18. This electric crane handles a concrete form at Iroquois Lock.

San Andreas, California . . .

another example of the cost-cutting features that bring repeat orders for Bucyrus-Erie rotaries

On the strength of the performance records of a Bucyrus-Erie 50-R rotary blast hole drill placed in operation in 1954, the Calaveras Cement Company recently installed a new Bucyrus-Erie 40-R drill at its No. 1 quarry near San Andreas, Calif.

The 40-R is drilling 9-in. holes through limestone to an average depth of 70 feet. Even though this rig has been operating only a short time, the drill operator reports the 40-R is "doing a fine job." Calaveras Cement is believed to be the first cement company in the West to convert completely to rotaries — all Bucyrus-Erie.

Among the many reasons for the outstanding success of these drills are: rotary drive with Ward Leonard electric control of rotating speed; hydraulically powered pulldown force; remote-controlled power-driven tool handling unit; and air blast cleaning of drill holes.

Two models are available — the 40-R for drilling 6¾- to 9-in. holes, and the 50-R for drilling 9⅞- to 12¼-in. holes. Holes can be drilled continuously for 32 ft. 9 in. (50-R) and 27 ft. 9 in. (40-R) before an additional pipe section has to be added.

Bucyrus-Erie rotaries can speed your drilling operations . . . cut your drilling costs. Write direct for detailed, illustrated literature. 57857C

A Familiar Sign . . . BUCYRUS ERIE *. . . at Scenes of Progress*

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

With 30 to 50% fewer moving parts, the Allis-Chalmers diesel in this shovel...

...puts more power to work digging and loading

THERE IS UNUSUAL SIMPLICITY in Allis-Chalmers engines. The Allis-Chalmers diesel in the shovel shown working above, for instance, *has 30 to 50 percent fewer wearing parts than competitive engines!*

THAT MEANS LESS WEAR . . . LESS THAT CAN GO WRONG when parts are fewer and stronger. Your equipment keeps working; you do more digging and loading.

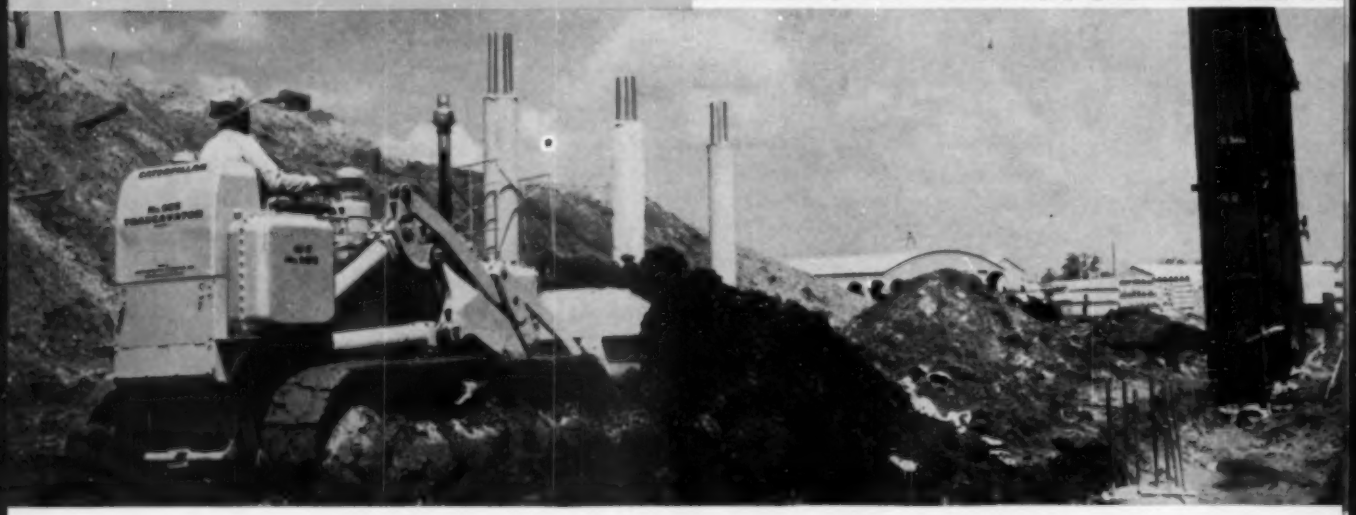
MORE POWER GOES TO WORK with Allis-Chalmers engines — not only because there are fewer moving parts, but because more efficient combustion means maximum power from the fuel.

You can have this simplicity, economy and durability in Allis-Chalmers engines of *any* size or type, 9 to 516 hp — *any* fuel, LP or natural gas, gasoline or diesel — for *any* application. See your Allis-Chalmers dealer for full information. Allis-Chalmers, Buda Division, Milwaukee 1, Wisconsin. BC-7A

ALLIS-CHALMERS *Engineering in Action*

"ONE DEMONSTRATION OF THE NO. 955 TRAXCAVATOR* AND I WOULDN'T LET THEM TAKE IT BACK!"

F. V. Minor, Dallas, Texas



F. V. Minor had a subcontract from Austin Bridge Co. to dig bridge abutments and clean up dirt along a railroad overpass retaining wall west of Dallas. The earth was packed hard and when he tried to use a loader of another make, he found the machine just couldn't get into it.

Then the Caterpillar Dealer brought a No. 955 Traxcavator out to demonstrate. And once he'd seen how it did the work, Mr. Minor wouldn't let them take it away. A lot of other contractors know just how he felt. The Caterpillar No. 955 Traxcavator has been a success from the day it was introduced. It really licks the tough jobs.

This fast, efficient excavator-loader has a 1½-cu.-yd. bucket, 80 inches wide. A dependable 70 HP CAT* D315 Engine gives it plenty of digging power in tough materials. The bucket has full 40-degree tilt-back at ground level to prevent spillage, and 128-inch lift height for easy loading.

Operators like the No. 955 for its exceptional visibility and fast-acting hydraulic controls. Bucket lift and tilt levers are positioned for easy one-hand operation. And the exclusive Caterpillar oil clutch adds to long work life and reduces maintenance.

If you've got a difficult excavating problem, ask your Caterpillar Dealer to demonstrate a Cat-built Traxcavator right on your job. In addition to the No. 955, he can show you the No. 933 (1 cu. yd., 50 HP) and the No. 977 (2¼ cu. yd., 100 HP). He'll prove to you that they're built to do more work and harder work at lower cost. You can count on him, too, for prompt, reliable service and parts you can trust. Talk to him today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

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Excavating Engineer

founded 1905

South Milwaukee, Wisconsin

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The Low-Down on Low-Bowl Scrapers

A wide, low bowl is important in a scraper, but it takes more than just low-bowl design to give you performance with the best profit factor.

That's why Allis-Chalmers combines this with other equally important features to give you the most efficient scrapers available.

CHECK THIS PROFIT-BUILDING COMBINATION:

1.

Low, wide-bowl design for fast, heaped loading.

2.

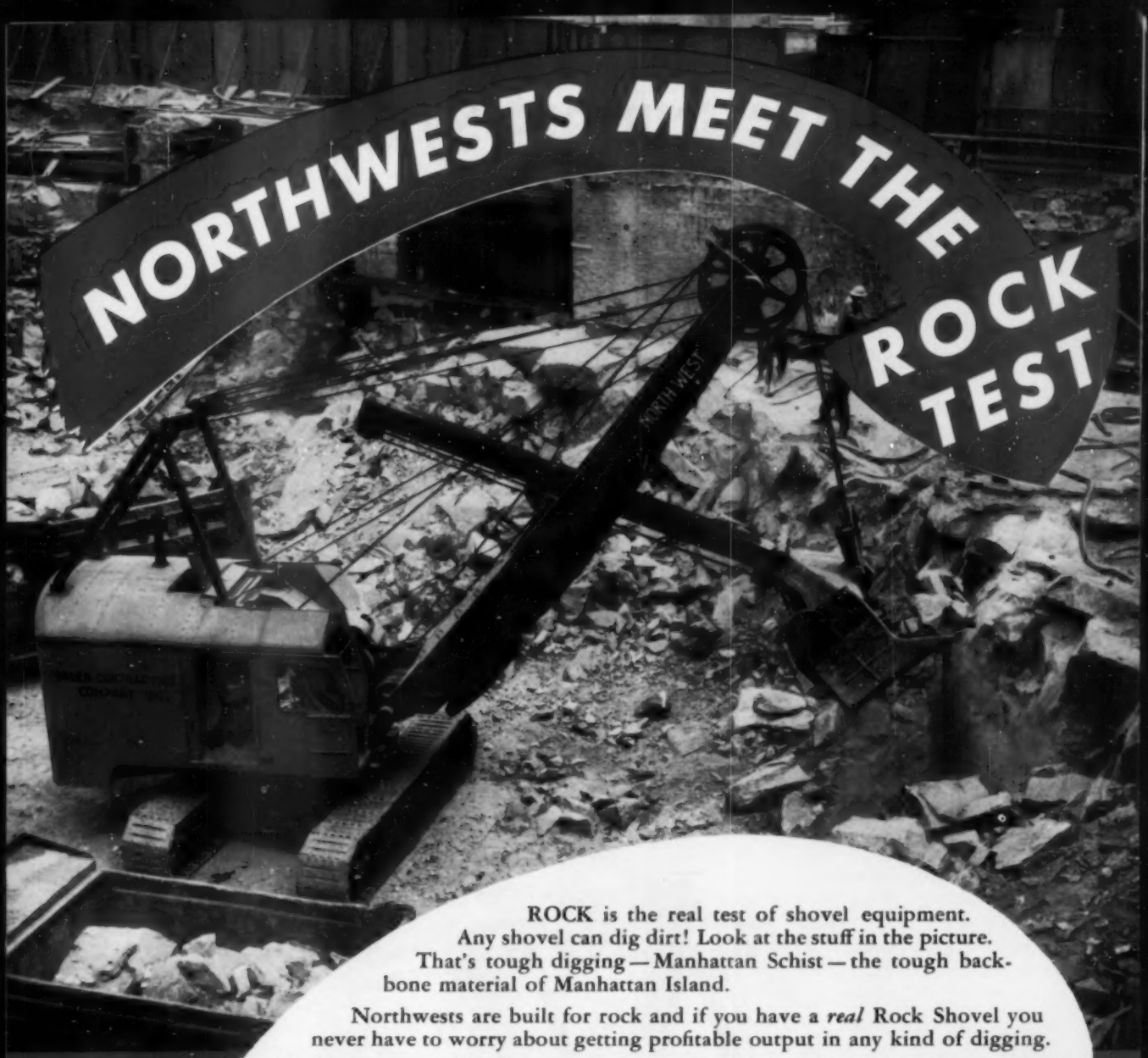
Curved bowl bottom and offset cutting edge for faster, easier penetration and live, boiling loads that fill every corner of bowl.

3.

Patented apron-ejector linkage combines high apron lift with positive, forward forced ejection—permits either quick, complete dump or smooth, even spreading.

Your Allis-Chalmers dealer will be glad to discuss these and many other profitable advantages with you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*



ROCK is the real test of shovel equipment. Any shovel can dig dirt! Look at the stuff in the picture. That's tough digging — Manhattan Schist — the tough backbone material of Manhattan Island.

Northwests are built for rock and if you have a *real* Rock Shovel you never have to worry about getting profitable output in any kind of digging.

Northwests load fast. Plenty of power combined with the Northwest Dual Independent Crowd that utilizes force most independent crowd shovels waste cuts through the bank without stuttering. Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and make spotting accurate without wasting time jockeying a load over the truck. The Cushion Clutch eliminates shock overloads before they reach the machinery. Northwest Booms, Northwest Machinery Bases, Northwest Crawlers are all designed and built to meet the worst jobs a shovel has to do.

These are just a few of the things that combine to give you a machine that will make money on your job.

If you are planning on new shovel equipment, ask for the latest information on Northwest before you buy. A Northwest man will be glad to give you complete details.

NORTHWEST ENGINEERING COMPANY

1506 Field Building • 135 South LaSalle Street • Chicago 3, Illinois

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS • TRUCK CRANES

THE GREATEST COMBINATION OF PROVED ADVANTAGES EVER BUILT INTO A SHOVEL, CRANE, DRAGLINE OR PULLSHOVEL

Direct-current System Powers

Bucyrus-Erie's Giant "River Queen"

Direct-current drive system proves best source of both power and control—vital factors in shovel operations

Power alone is only half the story in shovel operations. *Control* is also a vital factor. And, with direct-current drives you get both high-torque power and instantaneous control for efficient, economical shovel operation.

"RIVER QUEEN," Bucyrus-Erie's giant 55-cubic yard strip shovel is an outstanding example of combined direct-current power and control in action. D-c equipped, the "Queen" is used for overburden stripping at the River Queen mine near Central City, Kentucky. This mine is owned jointly by Peabody Coal Co. and W. G. Duncan Coal Co. and is operated by Peabody.

POWER—The "River Queen's" dependable direct-current drives supply constant, stepless power to hoist, swing and crowd this giant machine efficiently and economically. This power is demonstrated daily in its open-strip mining operation. The shovel gouges out rock and earth in 80-ton bites, swings the load 295 feet, dumps it in 100-foot piles, and then returns for another 55-cubic yard bite. The duty cycle is repeated again and again, 24 hours a day, every day of the year.

ONE MAN CONTROLS the movements of this huge machine. The fast response and precise speed control enables the operator to make one complete duty cycle in less than a minute!

D-C DRIVES CAN HELP YOU increase tonnage mined and speed operating cycles in your shovel operations. And, the rugged construction of adjustable-voltage direct-current shovel drives means reduced downtime and a minimum of maintenance.

Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania. 811-6

Progress Is Our Most Important Product

GENERAL ELECTRIC

CIMENTS FRANÇAIS

To maintain capacity output Ciments Français, leaders in the French Cement industry, favour big haul units and their choice is Aveling-Barford heavy-duty dumpers.

At the Gourville quarry—one of many where Aveling-Barford dumpers are used—the three machines shown below keep up a steady supply of material to the processing plant.

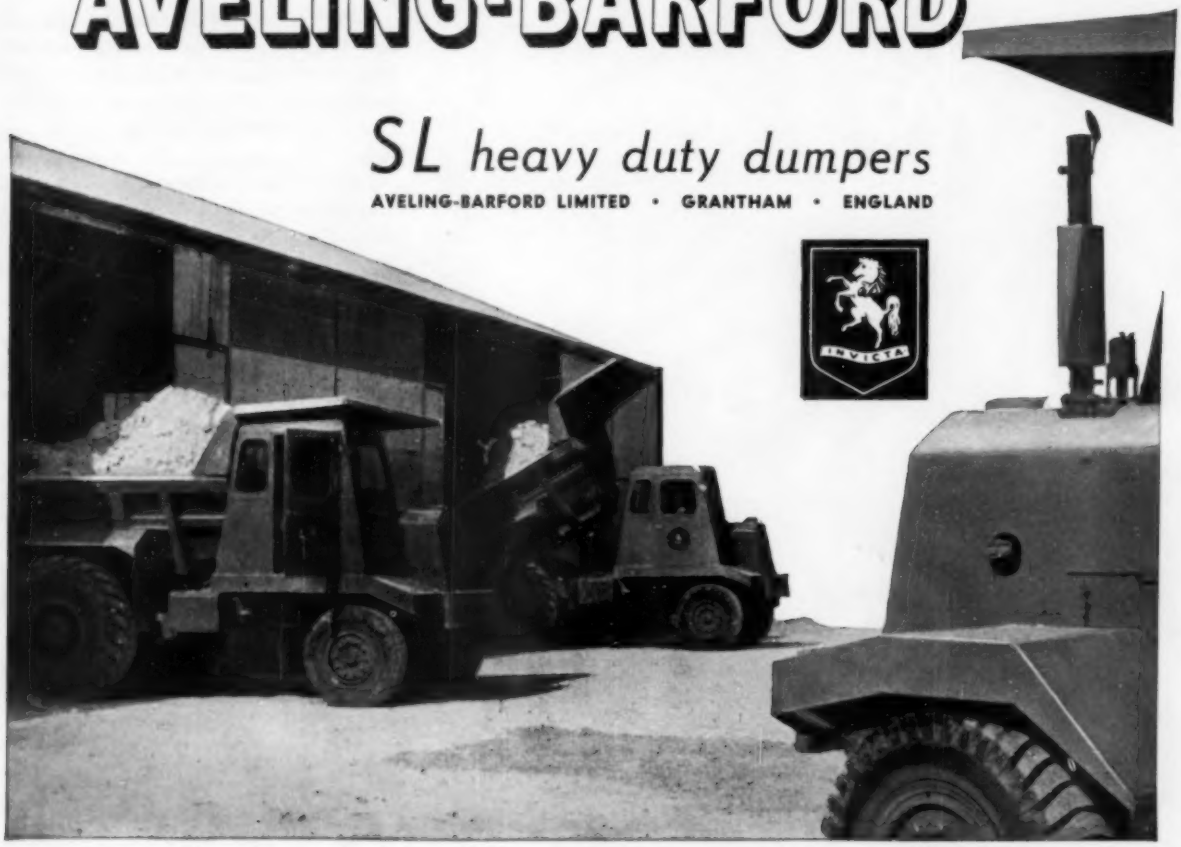
Two-way steering; four-speeds, forward and reverse; hydraulic tipping; power steering, and 150 B.H.P. for the 22,400 lb. payload are factors that make for fast working and low cost per load.

For full particulars please write for Folder No. 1747/10

AVELING-BARFORD

SL heavy duty dumpers

AVELING-BARFORD LIMITED • GRANTHAM • ENGLAND



Basic Hydrohoe Design Builds Profits from Many Angles

Mounted on a new or used commercial truck, the Bucyrus-Erie Hydrohoe gives you big-machine muscle that lets you dig deep, fast, precisely . . . plus mobility that's unmatched by any excavator available today — big or small. There is plenty of force at the dipper lip for penetration in tough materials. With the Hydrohoe, you load directly to trucks — no need to rehandle material.

In addition, the Hydrohoe offers unequalled flexibility with standard, narrow or wide wrist-action dippers or the specially-designed utilities dipper. This dipper rotates 95 degrees at the handle to dig short, deep holes quickly. With it you can cut square corners, even undercut the sides of the pit.

The Hydrohoe carries everything necessary to make quick work of spot repair jobs, trenching for water, sewer or gas mains, house connections or drainage ditches, plus dozens of other jobs.

Your Bucyrus-Erie distributor can tell you about excavating contractors who have found Hydrohoes ideal for their work — see or call him today.

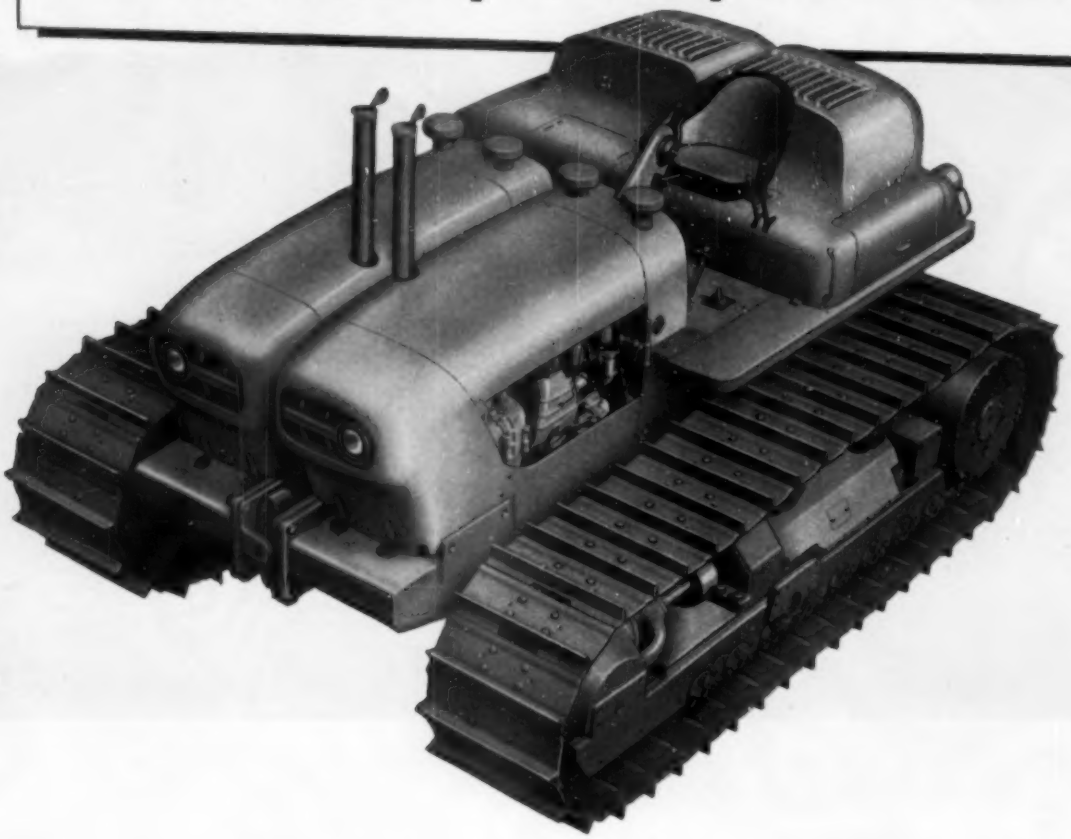
177H57C

A Familiar Sign . . . BUCYRUS ERIE *. . at Scenes of Progress*

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

NOW THE Euclid TC-12 GIVES YOU

more horsepower... more track area... more accessibility than any other crawler!



Ever since it was introduced more than a year and a half ago, the Euclid TC-12 Tractor has set completely new standards of crawler production and performance. It has proved, on job after job, that it is years ahead of the field in ability to do more work—faster, easier and cheaper. Now the TC-12 has even more power to handle the biggest tractor jobs.

Powered by two 218 h.p. engines with separate Torqmatic Drives for each track, there's a total of 436 horsepower. Big 27" standard shoes and 8 track rollers give good balance with the additional horsepower, heavy duty dozer blades and other attachments.

This new TC-12 Crawler has many other improvements that put it even further ahead of other tractors . . . in performance, ease of operation, maneuverability and service accessibility. Ask your Euclid dealer to prove that the TC-12 has no equal for big tractor jobs and have him show you why ***Euclids are your best investment.***

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

20% MORE WORK-ABILITY

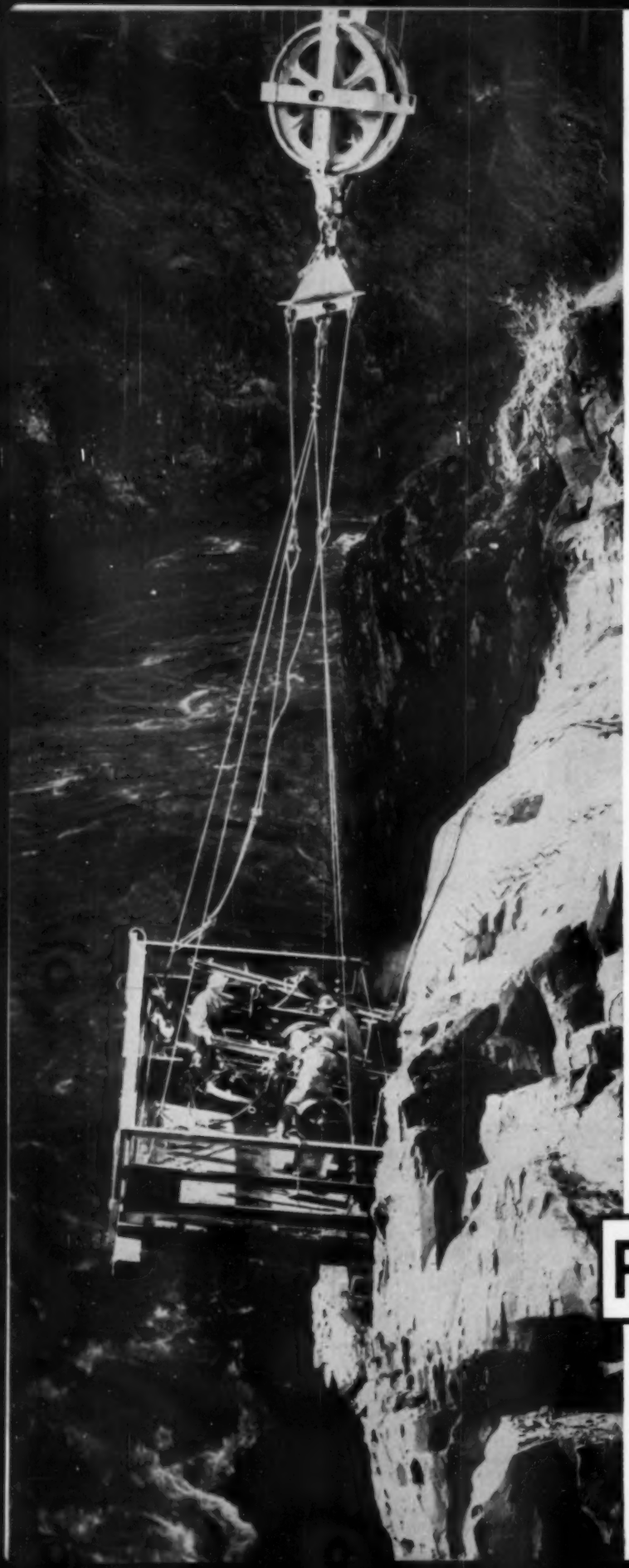
Euclid "Twins"—the TC-12 Tractor and Twin-Power Scraper—will move the cheapest dirt on the big road program or on any earthmoving job. They can set new production records at lower cost on your operations.

The Euclid TC-12 has exceptional maneuverability because each track has a separate power train. Operator has excellent visibility and "hair trigger" control of steering in any of the three speed ranges, forward or reverse.

With separate Torqmatic Drive for each big track, the TC-12 is fast on its feet, with plenty of power and traction for any big tractor job. It has proved its ability to outwork any other tractor on dozing, clearing, push-loading scrapers and pulling big equipment.

A high production machine, the TC-12 is easy to operate—delivers more push-pull drawbar horsepower at high travel speeds. Unitized assemblies and easy accessibility of major components permit servicing without major tear-down of other parts.

For push-loading big scrapers the Twin-Power "Euc" crawler has no equal. Torqmatic Drive provides a smooth, steady flow of power—changes from one speed range to another and from forward to reverse are made under full power.



AIR-BORNE ROCK DRILLS

Set 30′ Anchor Bolts in Steep Canyon

...another example of the outstanding versatility of I-R WAGON DRILLS

Suspended on cables high above the Cowlitz River in Washington, these two Ingersoll-Rand FM-4 Wagon Drills are used to drill and set 30 foot long, 1½" diameter anchor bolts in an almost vertical rock face. Arundel Corp. and L. E. Dixon Co., joint contractors for the Mayfield Dam, installed rock bolts to stabilize the rock formation.

These powerful, heavy-duty FM-4s were well suited to the job – easily maneuvered into correct drilling position with minimum jockeying of the cable car. They made fast work of drilling the 30-ft. holes and were also used for driving and setting the bolts.

I-R Wagon Drills are unequalled for drilling power, maneuverability and setup speed. Ask your I-R man for complete information – why the new, improved FM-4 can save you money in the long run. Call him today.

a Constant Standard of Quality

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

PUMPS • COMPRESSORS • DIESEL ENGINES • AIR & ELECTRIC TOOLS • TURBO BLOWERS • CONDENSERS

AD 5-644

Roadbuilders deserve the BEST in cranes... and get it in dependable Bucyrus-Eries!

When it comes to versatile lifting cranes, roadbuilders place their confidence in Bucyrus-Erie to deliver TOP PROFITS. They know that quality is built into every piece of equipment produced by Bucyrus-Erie — proved year after year through steady accurate lifts, long machine life, low cost maintenance, easy convertibility, and unmatched dependability.

These men get an after-the-sale bonus, too — prompt, reliable service. It helps keep their machines in top performing condition... assures outstanding performance.

See your nearby Bucyrus-Erie distributor soon for the complete story on dependable crawler cranes. Bucyrus-Erie Company, South Milwaukee, Wis.

328E57C

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

IN MASSACHUSETTS. This Minnesota contractor is working a long way from home on the Massachusetts Turnpike near Blanford. Here he uses a Bucyrus-Erie 38-B equipped with skull cracker to break up tough rock.

IN CHICAGO, ILLNIOIS. Following excavation of 14,000 yards of rock, this Bucyrus-Erie 51-B tackles piledriving, equipped with 80-ft. boom and 120-ft. leads in construction of the Calumet Skyway for the Illinois Thruway Commission.

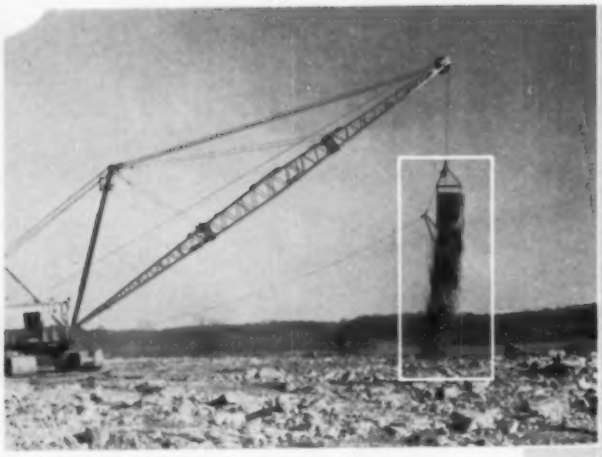
IN KENTUCKY. Equipped with 50-ft. boom, this ¾-yd. Bucyrus-Erie 22-B switches from clamshell to concrete bucket to make a pour in construction of a concrete bridge. The job, located on the Falmouth-Morgan Road, is being done for the Kentucky Department of Highways.

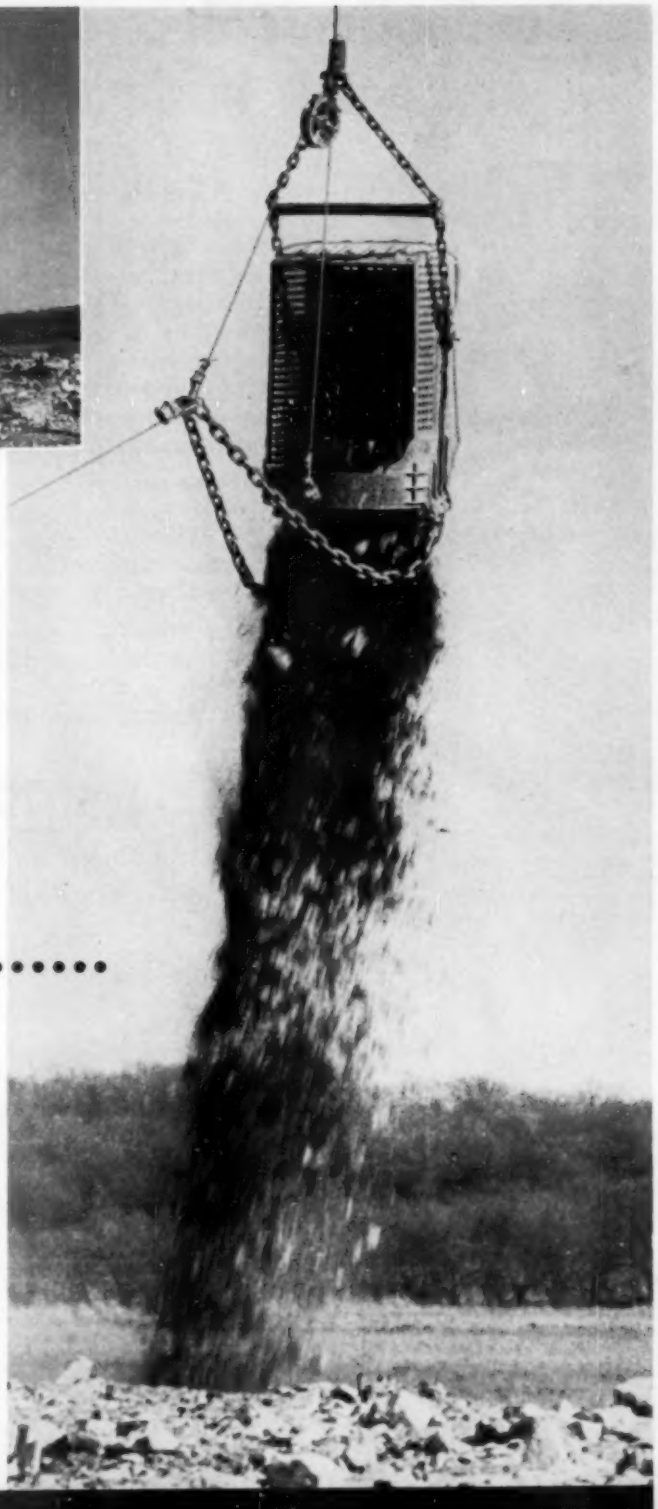
IN DALLAS, TEXAS. This Bucyrus-Erie 54-B takes full advantage of its stability and accurate boom control in handling and positioning steel sections weighing from one to 10 tons. It is erecting a bridge for Texas Turnpike Authorities.

CONVERTIBLE TO

SHOVEL ⅜-4 yards • DRAGLINE ⅜-4 yards • CLAMSHELL ⅜-4 yards • HOE ⅜-2½ yards

FOR A VARIETY OF EXCAVATING





lower cost per yard

Rugged work requires rugged equipment. Whatever the material . . . the built-in stamina of Hendrix Dragline Buckets keeps them on the job . . . producing more work at a lower "cost-per-yard." When digging conditions are rough . . . on small jobs or large . . . men who know always specify Hendrix.

"A Type for Every Digging Purpose"

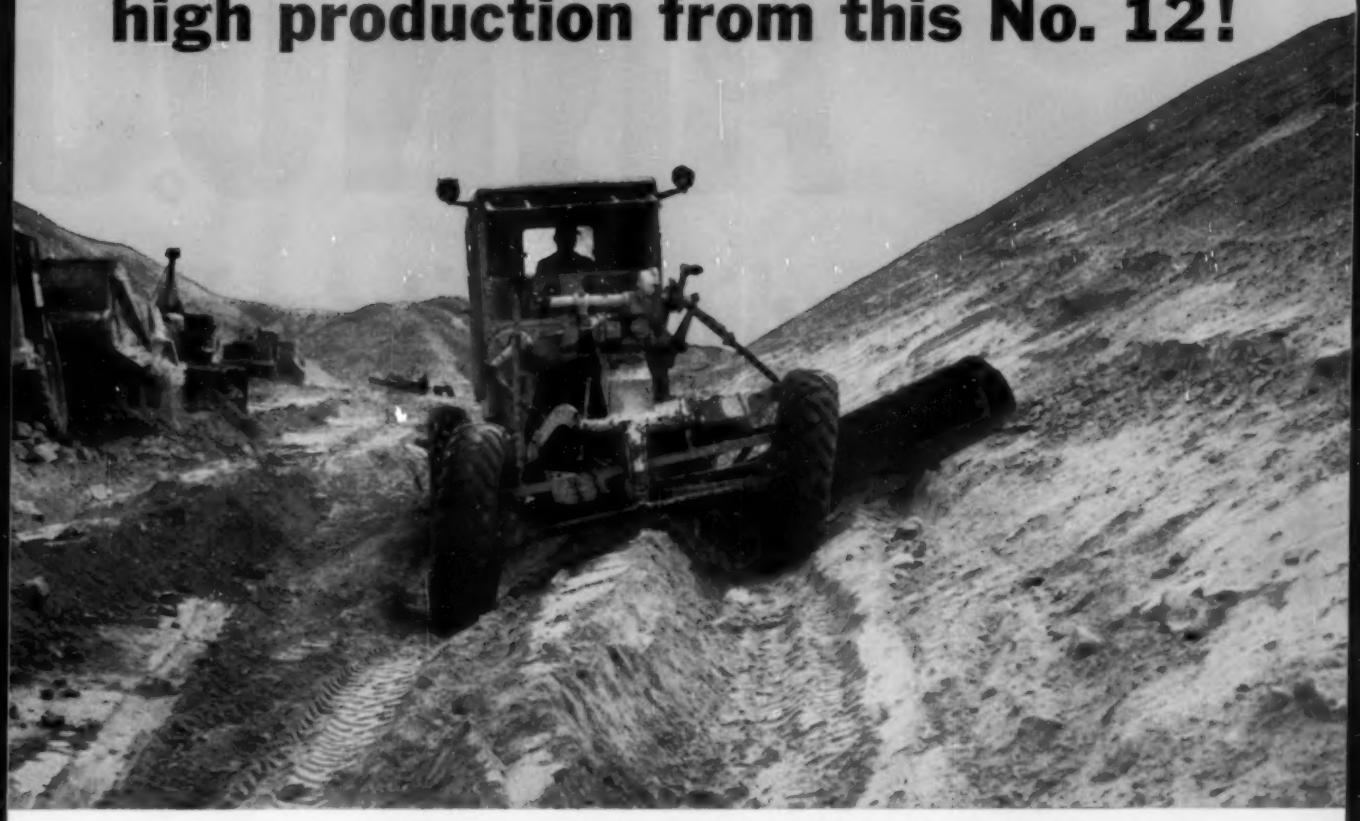
¼ to 40 Cubic Yards

All Hendrix Buckets available without perforations

HENDRIX DRAGLINE BUCKETS

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

Why Mr. Thorn expects and gets high production from this No. 12!



Besides bank sloping, this Cat No. 12 Motor Grader maintains haul roads for DW21s and DW10s on the 9.2-mile realignment of U. S. 91 near Mesquite, Nevada. Note D8 in background.

PAUL A. THORN

"We have owned Caterpillar products since 1927," says Paul A. Thorn, President of Thorn Construction Co., Inc., Springville, Utah. "We're firm believers in them because of economy, minimum down time, long life and constant engineering improvement. We also think that Caterpillar Dealer service is in a class by itself."

Speaking from 29 years of successful experience, Mr. Thorn now has a Caterpillar line-up that includes thirteen D8s, five DW21s, two DW10s, seven Diesel Engines, one Diesel Electric Set and six No. 12s. This No. 12, with 9999 hours on its hour meter, was part of the company's rugged yellow team on a 9.2-mile realignment of U. S. Highway 91. The contract involved moving 1,500,000 cu. yd. of dirt. Working 10 hours a day, 5 days a week, the No. 12 contributed its full share to money-making production.

Now an even more productive CAT* No. 12 Motor Grader

As good a machine as this "old" No. 12 has proved itself, there's even *more* work at *lower* cost with *less* down time built into the new No. 12. Constant engineering improvement is the reason. For example, the new No. 12 has an exclusive oil clutch that can operate up to 1500 hours without adjustment. New tubeless tires, now standard, save time and money by eliminating an estimated 80% of down time due to tube and flap repair and by providing longer tire life. These and other features add up to a new standard of grader performance!

Another point well worth considering: your Caterpillar Dealer backs you with prompt service whenever and wherever you need it. He has the trained mechanics and parts to do the job *fast* and *right*. See him for complete facts about the practical, advance-design features of the No. 12. Name the date—he'll be glad to demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

99% OF ALL CAT MOTOR GRADERS ARE STILL IN USE

ANNOU

Increased capacity ratings

THE Timken Roller Bearing Company announces an increase in the capacity ratings of most series of Timken® tapered roller bearings. Increases range up to 39%. Most are in the neighborhood of 10%. Some are negligible.

Permits Use of Smaller Bearings

This increase in capacity ratings makes it possible for many of you to use smaller bearings. Your products can be made more compact. You can save weight. You may be able to reduce the size of your shafts and housings. And you may be able to use Timken bearings in new applications where they have not been practicable in the past.

3 Reasons for Increases

What led to these increases in Timken bearing capacities? Three things: First, a careful review of more than 6,000 different laboratory studies

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

NCING!

for Timken® bearings

of Timken bearing performance on fatigue life machines. From these exhaustive studies, conducted on an organized, scientific basis since 1924, we keep learning more and more about predicting bearing life.

Second, refinement in the method of analyzing these studies mathematically.

Third, a careful review of the life of millions of Timken bearings in the field.

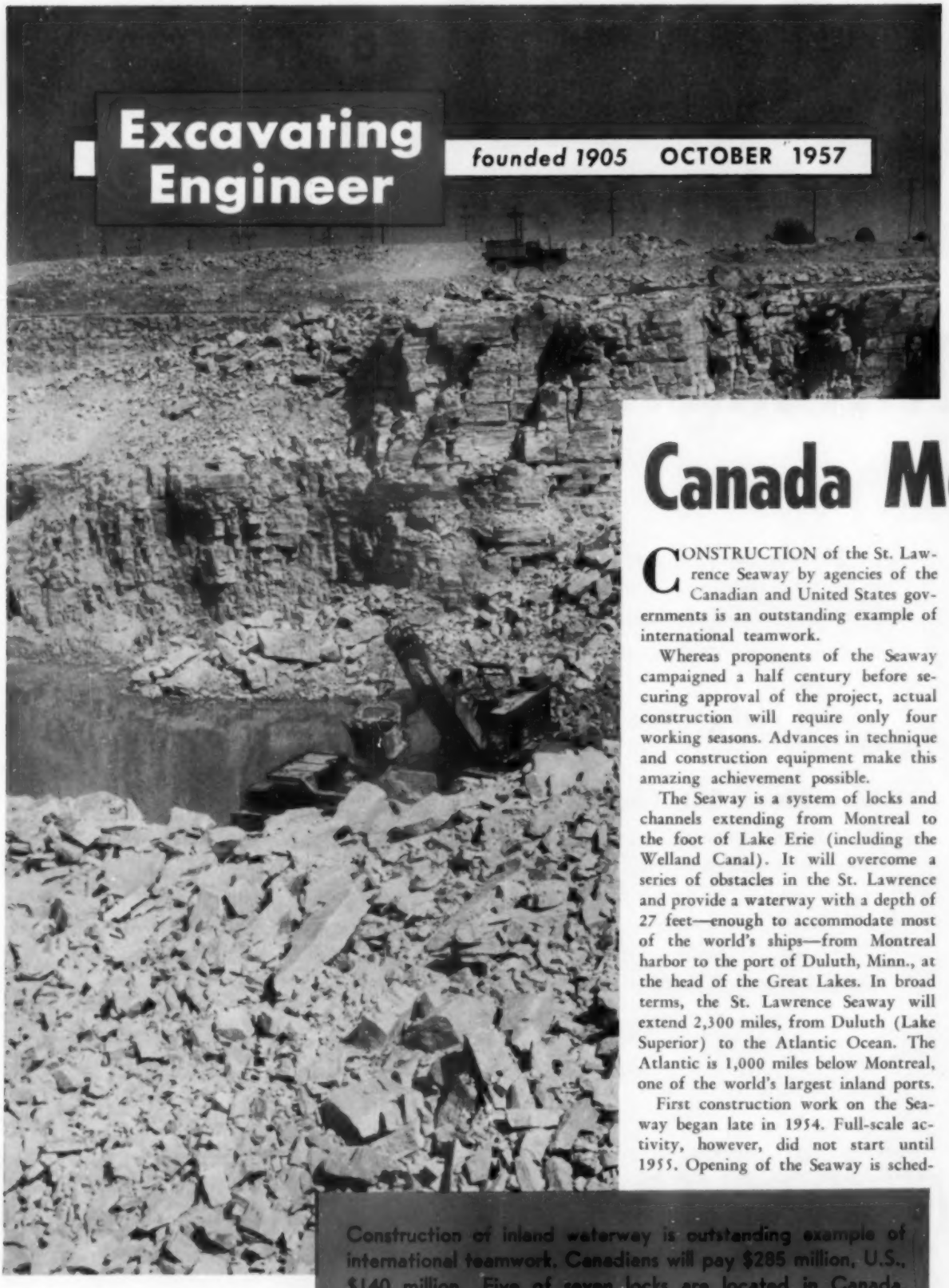
How Much Can This Save *YOU?*

To find out how the new capacity ratings affect the types and sizes of Timken bearings in which you are interested, call your Timken bearing representative or write our Engineering Department. We'll be glad to work with you at the drawing board stage. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TAPERED ROLLER BEARINGS ROLL THE LOAD

Excavating Engineer

founded 1905 OCTOBER 1957



Blasted sandstone on Beauharnois job is loaded to an end dump by a 3-yd. shovel.

Canada Mee

CONSTRUCTION of the St. Lawrence Seaway by agencies of the Canadian and United States governments is an outstanding example of international teamwork.

Whereas proponents of the Seaway campaigned a half century before securing approval of the project, actual construction will require only four working seasons. Advances in technique and construction equipment make this amazing achievement possible.

The Seaway is a system of locks and channels extending from Montreal to the foot of Lake Erie (including the Welland Canal). It will overcome a series of obstacles in the St. Lawrence and provide a waterway with a depth of 27 feet—enough to accommodate most of the world's ships—from Montreal harbor to the port of Duluth, Minn., at the head of the Great Lakes. In broad terms, the St. Lawrence Seaway will extend 2,300 miles, from Duluth (Lake Superior) to the Atlantic Ocean. The Atlantic is 1,000 miles below Montreal, one of the world's largest inland ports.

First construction work on the Seaway began late in 1954. Full-scale activity, however, did not start until 1955. Opening of the Seaway is sched-

Construction of inland waterway is outstanding example of international teamwork. Canadians will pay $285 million, U.S., $140 million. Five of seven locks are located in Canada.

s Challenge of Big Seaway Task

uled for the 1959 shipping season. To reach that target, construction equipment on both sides of the international boundary are working virtually around the clock.

What might not be realized in all quarters is that the majority of the Seaway installations lies in Canadian territory. Canada's St. Lawrence Seaway Authority will pay approximately $285 million as its share of the Seaway; the United States agency, the St. Lawrence Seaway Development Corp., will spend approximately $140 million.

Canada is building five of the seven new locks on the Seaway. Lengths of excavation and dredging on the Canadian side will extend over distances of 25 and 60 miles, respectively. Length of excavation in the United States will be 12 miles; dredging, 11½ miles. Overall Canadian totals include approximately 51 million cubic yards of excavation and 18 millions yards of dredging. Canada will build nine new railway and highway and access bridges and make extensive alterations to others. In addition, Canada is building the substructure for an international high-level suspension bridge at Cornwall. The United States will construct the superstructure.

Peak employment figures will be approximately 4,000 men on the Canadian side and 2,500 on the American project.

St. Lawrence Seaway work has been divided into six sections, running in this order from Montreal: Lachine section, 31 miles; Soulanges section, 16 miles; Lake St. Francis section, 29 miles; International Rapids section, 44 miles; Thousand Islands section, 68 miles; and the Welland section, 28 miles. The bulk of the Canadian work is in the 115 miles from Montreal to Prescott, Ont.

By sections, here is Canada's task.

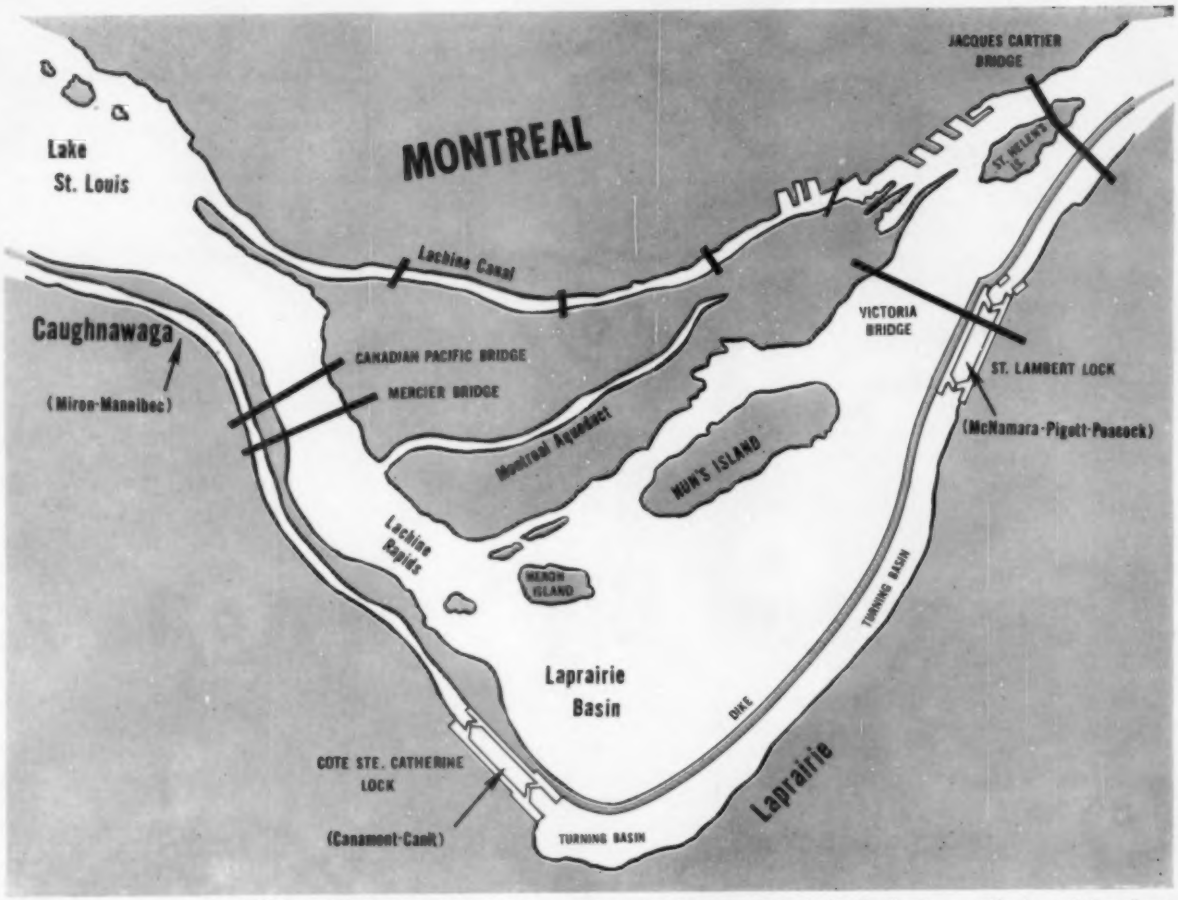
LACHINE SECTION

This section extends from Montreal Harbor to the head of Lake St. Louis, a 15-mile long widening of the St. Lawrence. Most of the 45-ft. drop in water level in this section is in the Lachine Rapids. Navigation currently bypasses the Lachine Rapids and enters Lake St. Louis through the 14-ft. Lachine Canal and five locks on the north shore.

The new Seaway is being built along the shore and around the Laprairie Basin on the south shore, opposite Montreal. This work includes construction of an 18-mile long canal, two locks and three turning basins. The canal is being built partly in the Laprairie Basin, behind high dikes, and partly overland. The first lock, about two miles upstream from the entrance to the channel is the St. Lambert. It will have a lift of 15 feet. Nine miles upstream is the Cote Ste. Catherine Lock, which will lift ships 30 feet into the channel leading into Lake St. Louis.

An important phase of the Lachine section work is modifications to bridges crossing the channel. The span of the Jacques Cartier bridge that crosses the channel has a clearance of only 40 feet above high water, some 80 feet short of the required 120 feet above the Seaway. The additional 80 feet will be obtained by replacing the existing deck truss span with a through-truss span (30 feet gained) and by jacking the bridge structure and extending the supporting piers upwards. Traffic will con-

This is the entrance to the Seaway. Approaches are prepared by dredges. Bridges are Jacques Cartier (fore) and Victoria. —van der Aa photo



Two locks and a canal will take shipping past Montreal on the south shore and into Lake St. Louis, a widening of the river.

tinue uninterrupted during this work, except for a few hours the night the through-truss span (which is being erected on falsework) is slid into position to replace the old span.

Work at the Victoria Bridge, an old railway-highway structure, will involve the erection of two lift spans—one at the bridge itself and the other at the upper end of St. Lambert Lock, upstream of the bridge. With these two lift spans and by using canal dikes and embankments, an uninterrupted flow of traffic will be maintained during the locking through of ships.

The Honore Mercier bridge and the Canadian Pacific Railway bridge will cross the channel about four miles above the Cote Ste. Catherine lock. The Mercier bridge will be permanently elevated over the channel and its southern approaches will be improved. Lift spans over the channel will be provided for the double-tracked railroad bridge.

Other work in this section includes channel dredging from the end of the channel construction to the beginning of the Soulanges section.

SOULANGES SECTION

The St. Lawrence falls 84 feet in the Soulanges section, which extends from the head of Lake St. Louis to the foot of Lake St. Francis, another widening of the river. The rapids in this section are now circumvented by the 14-ft. Soulanges Canal, which has five locks. The existing Beauharnois Power Canal, which supplies the Beauharnois Power House, will be utilized for the Seaway. The 16-mile long canal, built some 30 years ago with the Seaway in mind, is 27 feet deep and 3,300 feet wide.

The powerhouse, which can develop nearly 2 million hp, will be bypassed by two locks—the Lower and Upper Beauharnois. Each will have a lift of 42 feet.

LAKE ST. FRANCIS SECTION

After passing through the locks and the Beauharnois Power Canal, ships will move into Lake St. Francis, where the lone work required to provide the proper Seaway depth is the dredging of shoal areas. Total drop in Lake St. Francis is one foot.

INTERNATIONAL RAPIDS SECTION

Construction of the Seaway was aided inmmeasurably by the St. Lawrence Power Project, a joint $600 million undertaking of the Hydro-Electric Power Commission of Ontario and the Power Authority of the State of New York. The Power Project, which will create the pool for the Seaway, is being built in the International Rapids section. Activity is centered in the Massena (N.Y.) and Cornwall (Ont.) area, which are diagonally opposite each other on the river. The pool will be about 30 miles long, from 1½ to 4 miles wide.

Power works under construction in the Massena-Cornwall area include construction of a power house, which will develop 2,200,000 hp, an arched gravity control dam and an intake structure for the village of Massena.

Upstream about 25 miles, at Iroquois Point, the power entities are constructing a control dam. Also involved in the Power Project are highway and railway relocations, considerable channel enlargements and dike construction.

The two American locks—the Grasse

River and the Eisenhower—and a 10-mile long canal will bypass the power installations and lift ships nearly 90 feet into the artificial lake. This lake will lead to the final lock on the new Seaway. The Iroquois Lock and canal will bypass the Iroquois Control Dam. Maximum lift of this lock will be six feet.

The two American locks and the Iroquois Lock will be put into use in 1958 when the power pool is raised. This will force abandonment of the present series of canals and 11 locks now serving the International Rapids section on the 14-ft. system. The other four Canadian locks will not be ready until 1959.

Dimensions of the Seaway locks are: usable length, 768 feet; width, 80 feet; and depth over sills, 30 ft. Depth of the channel will be 27 feet. Widths will vary: a minimum of 200 feet when flanked by two embankments; a minimum of 300 feet when flanked by one embankment; and a minimum of 450 feet in open reaches.

THOUSAND ISLANDS SECTION

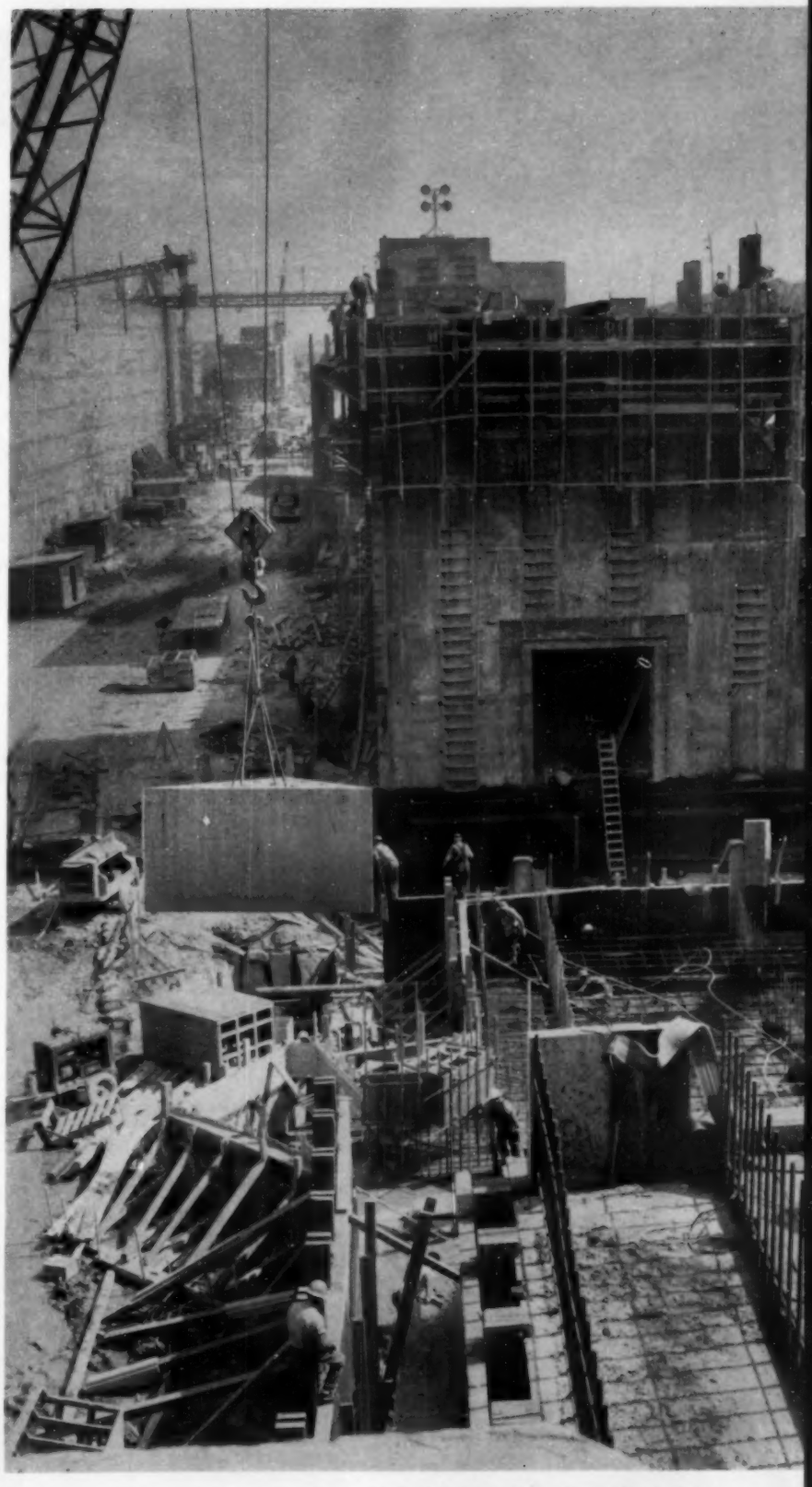
Most of the channel through the Thousand Islands section, which leads into Lake Ontario, is in American territory. The United States is doing most of the dredging and channel improvements in this section.

WELLAND CANAL

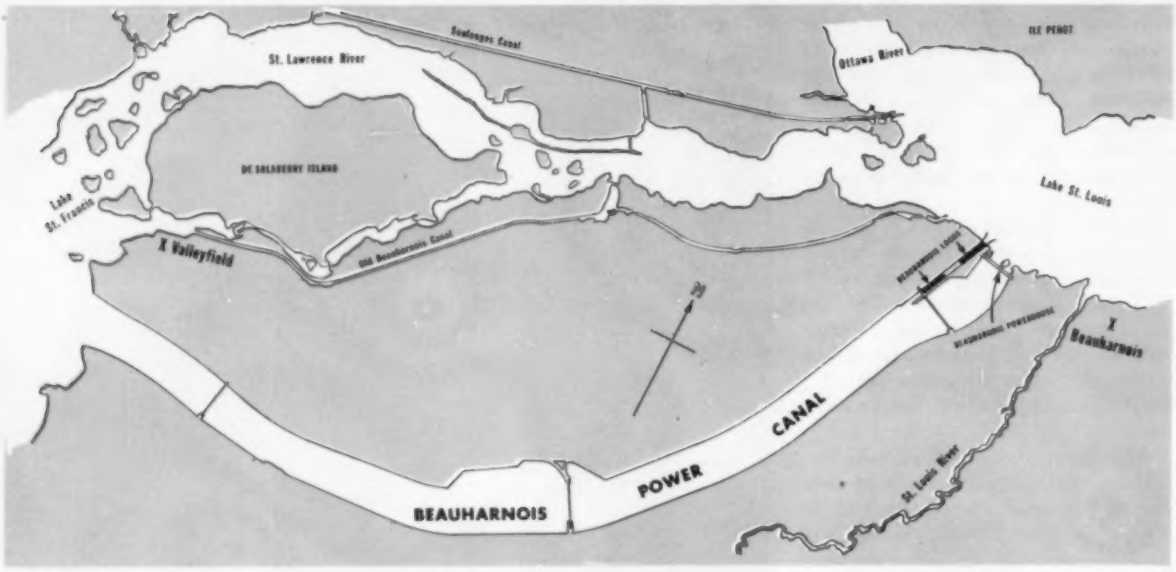
Completed in 1932 by Canada, the Welland Ship Canal is the 27-mile long bypass of the Niagara River and Niagara Falls. It connects lakes Ontario and Erie. The Welland's eight locks, which lift ships a total of 326 feet, serve as models for the seven new Seaway locks. All of the Welland's locks are 80 feet wide and are 30 feet deep over the sills. Seven locks are 859 feet long and the other is 1,380 feet.

About 17 miles of the Welland already have a draft of 27 feet. Dredging by the Canadians will provide the 27-ft. depth in the other 10 miles, where the controlling depth now is 25 feet.

That's the St. Lawrence Seaway. *Excavating Engineer* visited the American side of the project two years ago and recorded what it saw for the January issue in 1956. Recently, *Excavating Engineer* spent about 10 days viewing the entire Seaway and Power projects, paying particular attention to the work on the Canadian side of the Seaway. Reports of visits to the Canadian locks and channel excavation contracts will be found on succeeding pages.



A crane sets a large wooden concrete form in place at St. Lambert Lock, most easterly of the locks on the new Seaway. Canada is building five of seven new locks.



Two locks at Beauharnois will take shipping from Lake St. Louis into the Beauharnois Power Canal, which is 16 miles long.

I. Canadian Seaway Story:

Potsdam Sandstone Brings a Loud Moan

IF you're searching for a rock man's "paradise," visit Melocheville, Que. That's where contractors are punching through the toughest rock on the St. Lawrence Seaway project to build the Lower and Upper Beauharnois locks.

Potsdam sandstone, an extremely hard and abrasive rock, is the troublesome opponent at Beauharnois. Shovel teeth have worn out in less than eight hours digging it. Corner bits on dozers have lasted only one shift and tractor pads have required replacing in instances after only 600 to 800 hours of use.

Both lock contractors have devised interesting ways to excavate the rock, which serves to make the Beauharnois locks the most expensive of the five on the Canadian side of the Seaway.

Cost of the lower lock will be about $12 million; the upper lock will cost about $15 million.

Canit Construction Ltd. of Montreal is the contractor for the lower lock. Four Montreal firms form the joint venture, United Waterways Constructors Ldt., executing construction of the upper lock. These firms are: Angus Robertson Ltd., Foundation Co. of Canada, Pentagon Construction Ltd. and H. J. O'Connell Ltd. Angus Robertson is the sponsor company.

The Potsdam sandstone—some of the men on the job might have less dignified names for it—has proved to be especially troublesome for United Waterways. That's because United Waterways encountered an unexpected faulted zone containing 200,000 cubic yards of the stuff.

"It's a massive fault," said E. A. Buie, the 40-year-old Canadian who is project manager for United Waterways. "When we hit the zone, our drilling speeds dropped. Our wagon drills were lucky to get eight feet an hour in the stuff—they should have been getting 30. But we just had to rap through it—taking advantage of every break."

Having encountered the sandstone and the fault, United Waterways sought ways to reduce drilling, excavating and maintenance costs. Of principal concern was keeping drilling costs within reason.

To get an idea of how drilling was

United Waterways is constructing the upper lock through Potsdam sandstone, which is drilled by these six machines—a jet piercer (background) and five churn drills.

United Waterways uses jet piercer to drill blast holes in the stuff at Beauharnois.

slowed up by the broken rock in the faulted zone, churn drill speed was reduced in some cases to six feet per day (two 10-hour shifts). In the space of an hour and a half, 16 wagon drill steels were stuck, some of which had penetrated only a few feet into rock.

United Waterways found a partial solution to its problem in the jet piercing machine, which burns 6-in. holes through certain spallable rock or ore, including Potsdam sandstone.

The jet piercer, which United Waterways obtained from the Linde Co. in August 1956, uses thermal energy in the form of a flame produced by a rocket-type burner. The flame, with a temperature exceeding 4,000°F, is produced by a liquid hydro-carbon fuel combined with high-purity oxygen in the burner. The gas velocity of the flame is about 6,000 feet per second. The flame, whose mechanical energy equivalent is about 500 hp, is not more than 18 inches long or two inches in diameter. The jet piercer consumes 10 gallons of diesel fuel and 9,000 to 10,000 cubic feet of oxygen hourly.

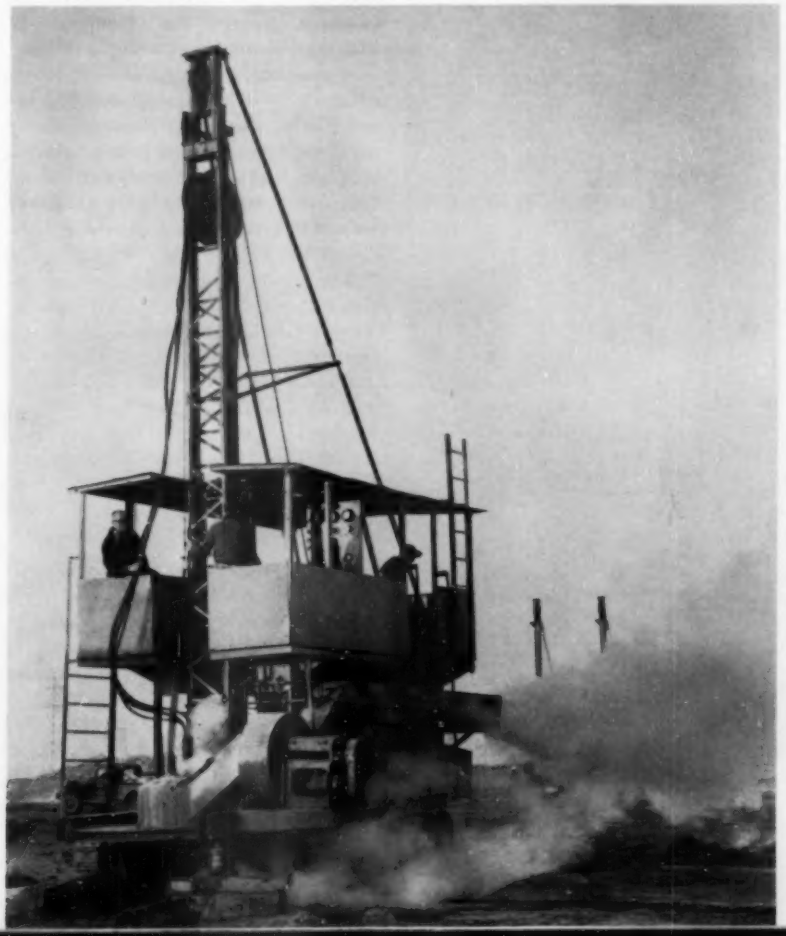
The process depends on heating and cooling. The rotating flame heats the face of the Potsdam sandstone to a white heat. When a stream of water strikes the heated surfaces, a sudden cooling shatters the rock. This spalling, or flaking away, of rock continually exposes new rock.

Water is an essential part of the jet piercing process. It cools and preserves the combustion chamber and burner nozzle. It quenches and embrittles material in the rock that the flame may have fused. Most of the water turns to steam which, with combustion gases, blows the cuttings out of the hole.

The jet piercer is putting down holes for United Waterways at the rate of about 125 feet each 10-hour shift, including moving and setting-up time. It is accounting for 220 cubic yards of rock per hour at a cost of 35 cents per yard. This is virtually the price per yard obtained by using the churn drills, whose pace was something like 2 lineal feet per hour.

The jet piercer is working 20 hours a day, five days a week. Supplementing it are five Bucyrus-Erie churn drills—three 29-T's and two 42-T's. A fleet of 22 Gardner-Denver, Ingersoll-Rand and Copco wagon drills is used for line and pattern drilling, small box cuts, crossovers and finish work.

Here is a closeup of the jet piercing rig converted from a Bucyrus-Erie 27-T churn drill. Oxygen is supplied from a Linde cylinder trailer carrying enough for one shift.



United Waterways' Beauharnois spread is directed by E. A. Buie, project manager.

Buie is directing his spread over a job that is more than 4,000 feet long and contains a variety of excavating problems. The job involves both wet and dry excavation. Approximately 350,000 yards of concrete will be poured.

Dry excavation will total 1.5 million yards of rock and 1 million yards of common. The lock will tie into the Beauharnois Power Canal, from which United Waterways will dredge 30,000 yards of rock and 200,000 yards of common.

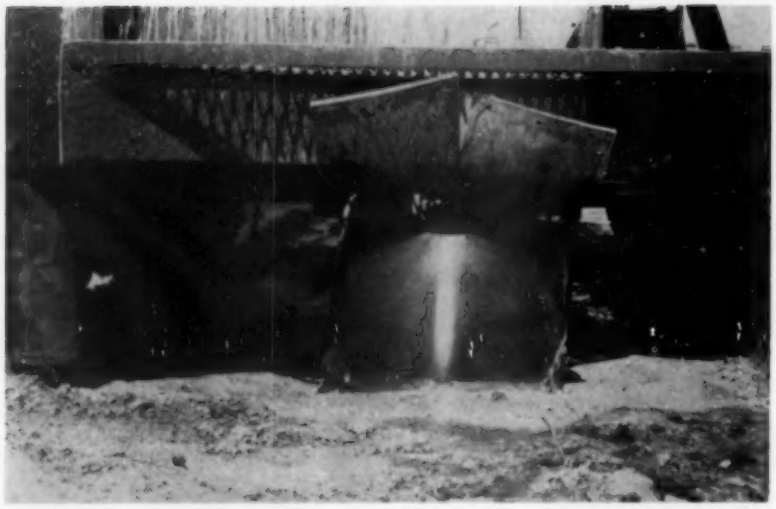
Divert Tracks Often

The job is divided into north and south sections by a fill embankment of the New York Central Railroad. Before the project is completed, United Waterways will have diverted the railroad three times on a wooden trestle, each time on a Sunday with a maximum of 12 hours allowed for the operation. Eventually, the railroad will be carried over monoliths 5 and 6 of the lock on a swing span.

On the south side of the fill embankment, the water table rises up to four feet above ground level in certain areas. The water table is at approximately ground level on the north side.

Overburden varies from 6 to 20 feet. Gray marine clay, some of it dredged disposal from the canal, comprises the top layer of up to seven feet. The main layer is of gray unweathered marine clay.

Because of the instability of the overburden, its removal is being handled carefully. Best progress was made on the northern extremity of the project,

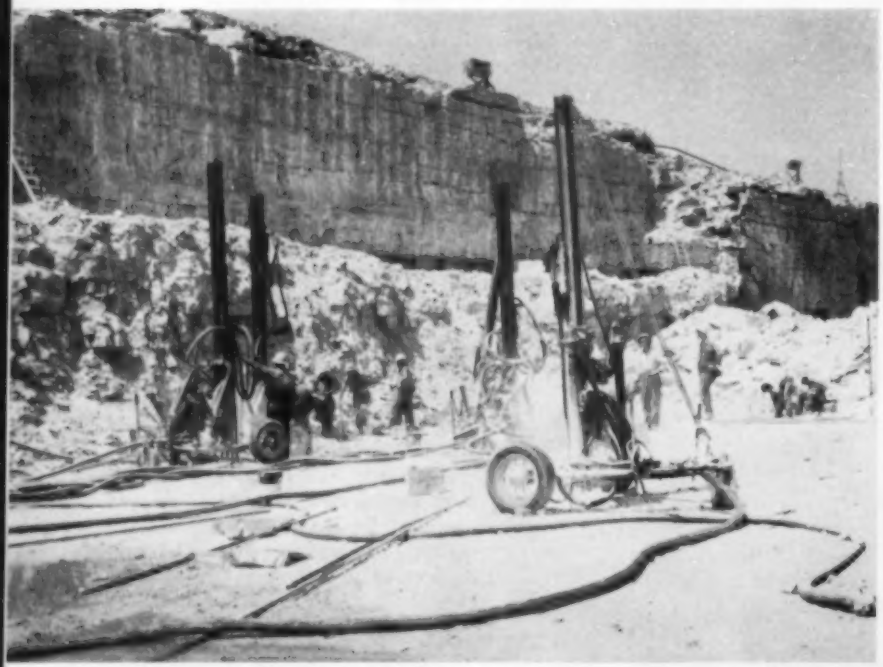


Sparks fly and steam billows as the searing jet-piercing flame stabs into rock. The flame, whose temperature exceeds 4,000° F., is not more than two inches in diameter.

where dragline ditches were cut along each side of the excavation before scrapers and shovels moved in. The last 500 feet north of the railroad embankment presented heavier overburden of a soupier character. Operating from a rock road, draglines used their maximum reach to excavate down the side of the overburden. The water table in the remaining material was lowered by using pumps. Winter brought a consolidation in the material and its subsequent removal by shovels.

Buie also plans to remove overburden south of the embankment with a land dredge. This section includes the dike presently retaining the Beauharnois Power Canal. United Waterways is completing construction of a retaining wall and a dike containing 50,000 yards of fill. Concreting work was being completed in June on placement of stop logs in the upper gate area. This would protect the work area should the pressure from the canal cause a break through.

If overburden excavation was a problem to Buie, rock removal is even a tougher obstacle. Because of the tough drilling in the faulted zone, United Waterways still was slightly behind schedule on excavation in June. Other phases of the job were moving well.



United Waterways' fleet of 22 wagon drills is used for line and pattern drilling, small box cuts, crossovers and finish work. The job contains 1.5 million yards of rock.

Maintain 40-ft. Faces

Drilling was being done on a plan to maintain 40-ft. faces as much as possible. The five churn drills put down 9-in. holes on a general 17x20 pattern, although this varies to as high as 24x24. The jet piercer's 6-in. holes also generally are on a 17x20 spacing, athough it drops at times to 15x15. Some jet-pierced holes are chambered at the bottom for heavier powder charging. Timken, Ingersoll-Rand and Copco carbide insert bits are used on wagon drills.

Holes are loaded with 40 and 75% Forcite (Canadian Industries Ltd.) with a factor of 1.2 pounds per cubic yard. Two rows—nine or 10 holes—are shot at a time. Fragmentation is good, Buie said.

Excavation is being removed with the following machines, all of which are rigged either as shovels or draglines: a 4-yd. Lima 1601; a 3-yd. Link-Belt; a 2½-yd. Lima 803; and two 1½-yd. Koehrings. Both Limas, the Link-Belt and one of the Koehrings were busy loading rock the day *Excavating Engineer* visited the hot, dusty job. In one two-month period last spring, about 250,000 yards were excavated.

A fleet of 15 end dumps—11 International 25-ton Payhaulers and four 22-ton Euclids—haul the rock to one of three locations: 1, to a rock crusher, a 4,000-ft. haul; 2, to a breakwater being constructed in the lake below the lower lock, a 3½-mile round trip; and 3, to fill areas, a haul of one mile.

The crusher is being operated by Canit Construction Ltd. on a separate Seaway contract to provide aggregates for the Beauharnois project. The aggregate is supplied to batching plants operated by Canit, United Waterways and by Quebec Hydro, which is enlarging its Beauharnois Power Plant. More will be said about this setup later.

Scrapers Are Active

Some of the overburden was removed by Caterpillar scrapers pulled by three Cat D9 tractors. A 25-ton Euclid scraper unit was scheduled to be added to the fleet. Dozer equipment includes five International TD-24's and two TD-14's.

Concreting, which had barely begun when *Excavating Engineer* visited the

job, should be in full swing at this printing. Pouring is being handled by two conveyors—one a Barber-Greene and the other a home-made unit—and a 25-ton Link-Belt, a 4-yd. Marion 111-M crane, a Lima 1250 and a Lima 1601, swinging 2 and 4-yd. buckets.

United Waterways will utilize an 80-ft. high Acrow steel wall form for pouring 30 of the lock's 62 monoliths. It will run on rails. The form is 40 feet wide, same as a monolith.

"The form is designed to handle a pour of five feet an hour," said Buie, "although we plan to pour roughly three feet an hour. Our aim is to pour two monoliths a week. For our other sections, we will use cantilever steel forms with plywood backing."

United Waterways has been at Beauharnois since July 1, 1956. It is scheduled to complete the job by the end of 1958.

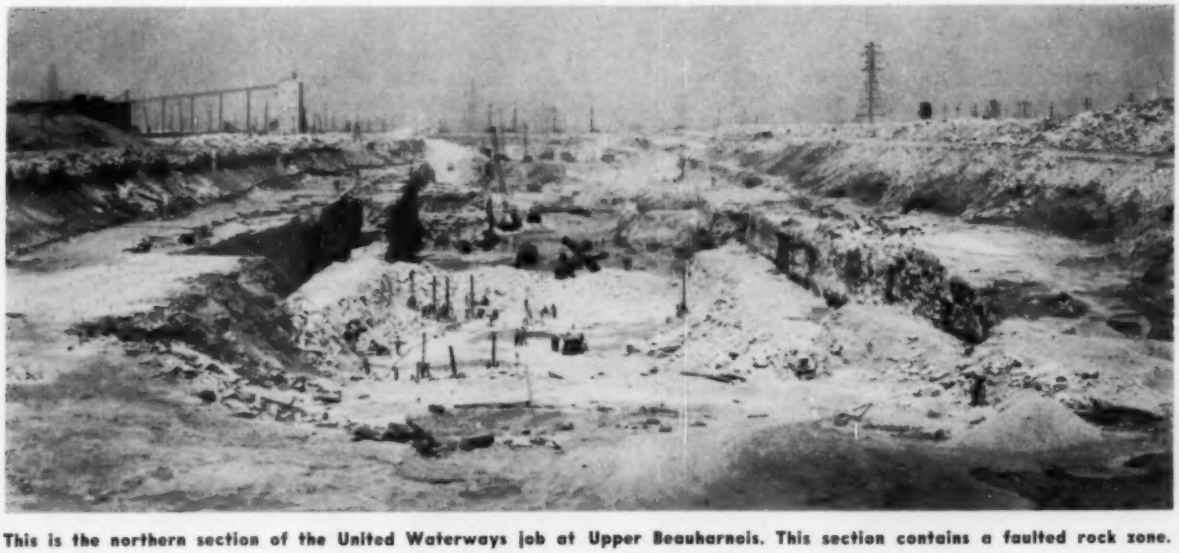
Two 10-Hour Shifts

Buie is handling his first big job as a project manager. Formerly with Morrison-Knudsen Co., Walsh-Canadian and Northern Construction, he has worked on some heavy construction projects.

Buie's spread at Beauharnois is working two 10-hour shifts, five days a week. At peak activity, the payroll will include about 850 names.

Other personnel includes: Doug Sauer, chief engineer; John MacDonald, general superintendent; Allan Iverson, excavation superintendent; Charlie Upton, concrete superintendent; Joe Tonelli, mechanical superintendent; and Joe Poirier, carpenter superintendent.

(Above) A 1½-yd. shovel loads blasted sandstone to International Payhaulers. (Below) A truck crane handles concrete. Construction of the lock will be completed in 1958.

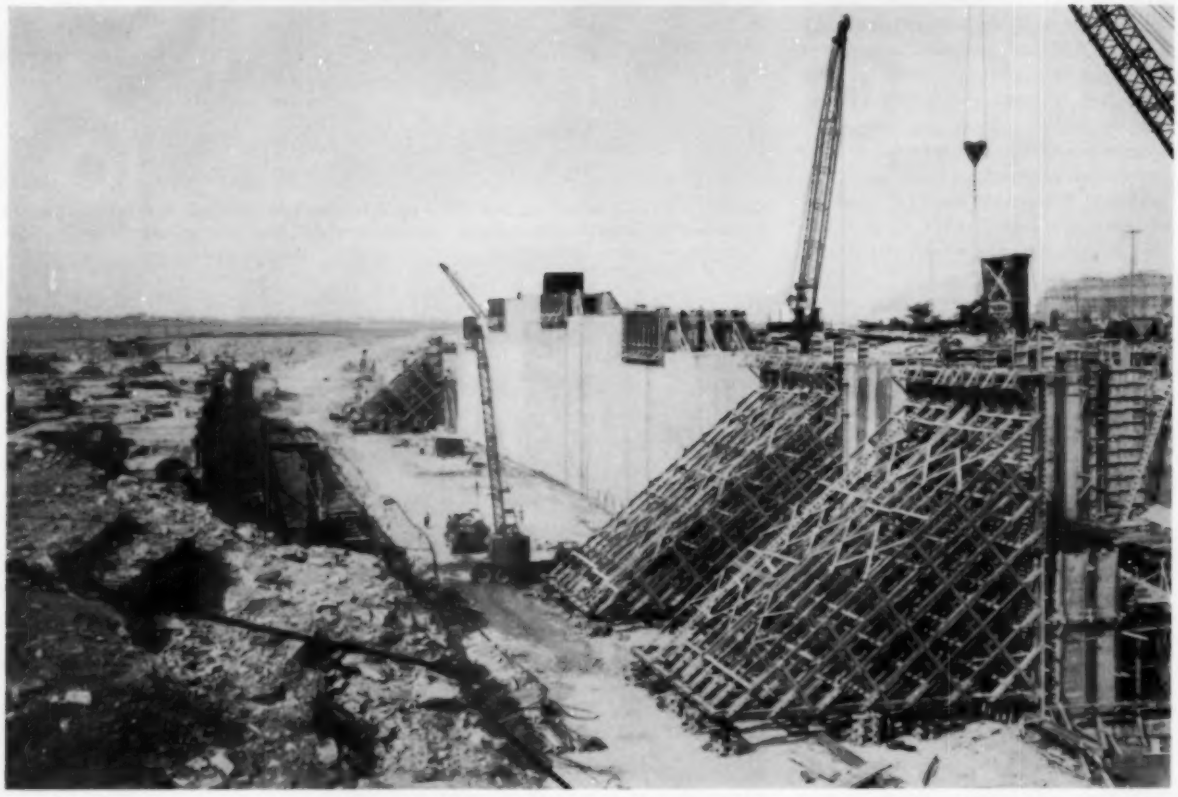


This is the northern section of the United Waterways job at Upper Beauharnois. This section contains a faulted rock zone.

II. Canadian Seaway Story:

Churn Drills Have a Big Inning

Canit Construction's project manager on Lower Beauharnois Lock job determined that churn drills were most economic for drilling blast holes in sandstone. He bought nine in the U. S.



Three 33-ton wooden wall forms, each 50 feet high and 40 feet wide, are used in Lower Beauharnois concrete operation.

A COT in J. P. Potvin's office indicates that his job keeps him from driving to his home some nights. Potvin, a small, handsome French-Canadian, is the busy project manager for Canit Construction Ltd., which is building the Lower Beauharnois Lock.

Potvin can step out of Canit's field office at Melocheville and watch his men pour concrete higher and higher in the lower lock. When *Excavating Engineer* visited the job in mid-June, one of the 40-ft. wide monoliths had been topped out at 80 feet.

Potvin supervises two contracts. One is for excavation and construction of the lock and regulating channel. The other contract is for supplying about 1½ million tons of aggregates needed by United Waterways and Canit for construction of the locks. Canit also crushes stone for Quebec Hydro, which is building an extension to the Beauharnois Dam. All three have batching plants which are supplied from stockpiles leading from Canit's crushing plant. Base material comes from the United Waterways and Canit excavations.

The lower lock is being constructed in the abrasive sandstone, just as in the upper lock. Canit, fortunately, did not encounter a faulted zone as United Waterways did on the upper lock. Potsdam sandstone is Potsdam sandstone, though, and it's hard to drill.

Canit's total excavation will be about 1,200,000 yards—most of it sandstone. Initial lock excavation of about 500,000 yards was begun last November and substantially completed by April 1. Excavation for the lock is about 160 feet wide, 1,000 feet long and ranges in depth from 30 to 60 feet. All excavation is scheduled to be completed by next May.

After studying records of contractors who previously drilled in the stone, Canit decided that the most economic way to drill it was with churn drills, rather than rotary or impact machines.

Canit purchased nine Bucyrus-Erie 42-T blast hole drills from a Pennsylvania coal company which had converted to rotaries. To operate this fleet of drills, Potvin brought in a lineup of experienced drillers headed by Marian Schubat, a veteran driller.

"Records showed that previous con-

tractors in this area averaged about two feet an hour in sandstone with churn drills," Potvin said after one of many interruptions caused by an active telephone. "We found that by using a maximum tool weight on the 42-T's of 6,000 pounds, we could drill four, five and even six feet an hour. This is a particular area where churn drills can be used profitably."

Drilling was done with care to preserve the wall areas on each side and also at the bottom of the excavation. Gardner-Denver Air Tracs with 2½-in. bits drilled the remaining 10 feet on each side and the remaining 10 to 15-ft. cushion on the bottom. Two-ft. centers were used for this work, and the holes were prepared for light blasts.

Use Alloy Steel Bits

The 42-T's drill 9-in. holes to depths ranging from 22 to 60 feet and on 16x16 and 22x22 patterns. Because of the abrasiveness of the sandstone, alloy steel bits were chosen. Bits required sharpening after 10 to 12 feet of drilling. Complete bit sharpening facilities are maintained, including a Bucyrus-Erie bit sharpener and two Bucyrus-Erie furnaces. A supply of 60 bits is maintained.

Holes are loaded with CIL nitro and powder in canisters. Delays are used. To load a 50-ft. hole, three 2-ft. canisters of Nitrox, CIL's most powerful explosive, is dropped to the bottom with a primer. On top of this, up to 15 feet from the top, go Nitrone (intermediate strength explosive) and another primer. Sand is used as stemming.

Very little secondary drilling is necessary. Jackhammers drill block holes.

With the first-stage excavation completed, Potvin has reduced the number of active drills to four. United Waterways rented some of the others. In mid-June, Canit's drillers were 250,000 yards ahead of schedule.

First-stage excavation was handled by a Lima 1601 with a 4-yd. dipper and a 3-yd. Link-Belt 650. Both machines excavated about 1,000 yards per 10-hour shift, the Lima working on material drilled by the churn drills and the Link-Belt taking rock drilled by wagon drills.

Canit Construction Ltd. decided that the most economic way to drill the Potsdam sandstone was with churn drills. Here are four of the nine 42-T's Canit used on job.

A fleet that originally included 11 22-ton Macks and six 15-ton Euclids haul the rock to either a rubble pile serving the crushing plant or to the shore of Lake St. Louis for use as fill for the breakwater and approaches. Some of the hauling units since have been converted to concrete carriers.

Will Use 6-yd. Shovel

The excavating, now well more than half completed, will be resumed full-scale in December after the bulk of the concreting has been completed. An electrically-powered Marion 4161, now rigged as a crane for concrete work, will be converted to a 6-yd. shovel to handle most of the excavation. The Link-Belt currently is excavating on a reduced scale in the basin; the Lima 1601 has been transferred to Cornwall, Ont. A Dominion 1½-yd. hoe is used for gate area trenching and cleanup work. Canit's tractor fleet includes two Cat D8 and one Allis-Chalmers HD-16 bulldozers and two HD-16 front-end loaders. One dozer cleans up around the shovel and the other works in the disposal area. The front-end loaders are located in the working area and at the crushing plant. An Allis-Chalmers grader maintains

This 1½-yd. hoe is used for trenching and cleanup work in the gate area. Canit's total excavation will be about 1,200,000 yards. Excavation will be completed by May 1958.

J. P. Potvin (left), a project manager, has a discussion with a staff member.

haul roads, which are sprinkled with a 1,000-gallon Autocar water tanker.

The sandstone makes maintenance an important part of the operation. Complete machine shop and garage facilities are maintained. "This is murder," said Potvin. "Shovel teeth will last 20 hours, grader blades 25 hours and dippers two months. 'It's a rock man's paradise,' one of my friends told me. As far as excavation goes, this is one of the toughest jobs you will meet."

Concrete pouring is on schedule; one of the walls was well along during our visit. All but 25,000 yards of the 350,000 yards required for the job are scheduled to be poured by next March.

Canit thoroughly prepared for the busy concreting schedule last winter. Paul Dorval, general construction superintendent, and Canit's engineering department supervised the form work and planning.

"We took advantage of the winter season to gather up the most qualified carpenters to prepare the special forms to be used in the lock walls and gate areas," Potvin said.

Most elaborate of the forms are three 33-ton units of wood, which are 50 feet high and 40 feet wide. Moved on a set of 25-pound rails, each form is jacked up nine inches to provide a vertical face for the pour, which is at the rate of two feet per hour. The 45° angle bracing is of 8x8's; the sills are of 12x12's. Crib supports are at four evenly-spaced locations. The form is anchored with cables and turnbuckles.

Roof Limits Pour

Two 25-ft. lifts are poured with the form. The first lift is limited by the roof of the outlet tunnel. When the first lift is poured, the braces are taken off and the panels removed from the concrete face and hoisted from the top by cranes. Then a two-part traveling form is moved in for the tunnel roof, anchored and made ready for the second pour. Removable 4x4's are used for bracing.

"The big advantage of these forms," Potvin explained, "is that we can get a lot more volume than by building our walls in 5 to 10-ft. lifts. We pour the top 30 feet of the walls in three lifts by using cantilever forms. The big form is usually moved and made ready for a pour in about 12 hours.

Two traveling forms are used for pouring the approaches.

Concrete and forms are handled by one Northwest and four Marion cranes. Two of them are truck cranes—a 40-ton Marion 43-M and a 25-ton Northwest. The Marion crawler cranes are the 6-yd. 4161, the 4-yd. 111-M and the 2½-yd. 93-M. The cranes swing either 4 or 2-yd. buckets. Canit has tailored the 4-yd. buckets to meet close clearances.

Macks Carry Concrete

Some of the concrete is carried in 8-yd. tubs on altered 22-ton Mack trucks. The concrete fleet is completed by eight 4-yd. Daybrook and Maxon boxes with end chutes. The concrete is

Canit's batching plant contains two 4-yd. mixers. Trucks transport the concrete.

Canit has a contract to supply itself and United Waterways with 1½ million tons of aggregates from this crushing plant.

—van der Aa—St. Lawrence Seaway Authority photo

Winter weather did not stop Canit's crew. Here, track drills continue their task against a backdrop of benches that clearly reveal drill holes in the abrasive stone.

obtained from Canit's batching plant, which contains two 4-yd. mixers.

"We want to complete the lock for a Christmas present," Potvin smiled. "Our objective is to pour 100 yards of concrete an hour. We work five days a week and sometimes on Saturday to ready forms for work on Monday. We're going to keep the best carpenters during the winter to build forms for the regulating works."

Canit put in rush orders for equipment when it got the lock contract in July 1956. A batch plant was purchased in Denver, Colo., and was ready to operate six weeks later. Also on the site are the United Waterways and Quebec Hydro batching plants. United Waterways has three 2-yd. mixers and Ontario Hydro, two 2-yd. mixers. The three plants are served by an 800-ton capacity loading station.

Under its first contract, Canit will provide aggregate for itself and United Waterways. The aggregate plant is served from a rubble pile containing about 700,000 yards of sandstone. United Waterways and Canit trucks maintain the pile with rock from the lock excavations.

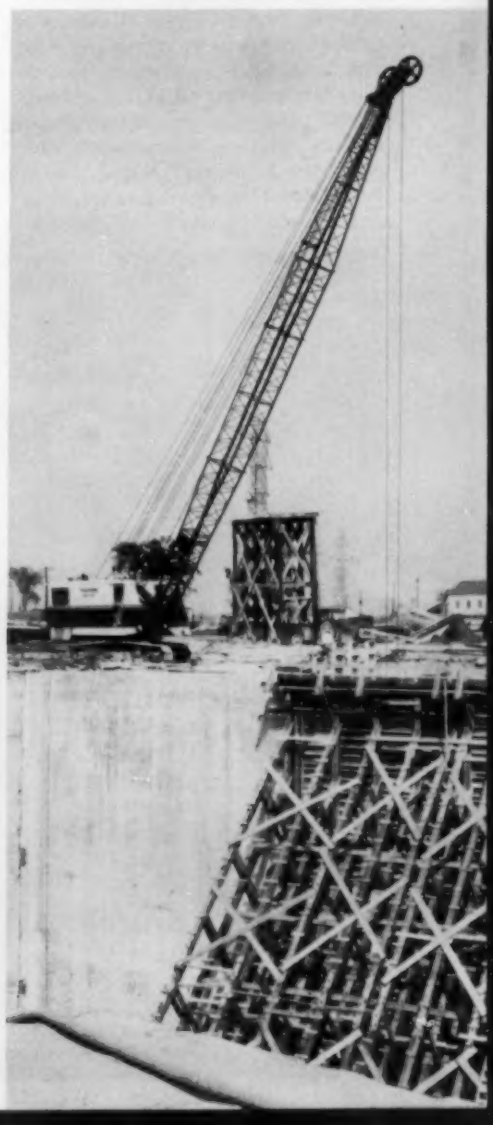
The plant produces sand and three sizes of stone: ¼-¾-in.; ¾-1½-in.; and 1½-3-in. The primary crusher is an Allis-Chalmers 4x5 jaw. Secondary and tertiary crushing is done by Symons standards and short heads. The plant has six Tyler screens. It contains 9,000 feet of belting. The stockpile reclaiming belt is 1,000 feet long.

Some work in the lock area was done under an earlier contract by Atlas Construction Ltd., Montreal. This included: 1, excavation of a tunnel that carries the rerouted Highway No. 3 under the channel above the lower lock; 2, building of a cofferdam to protect the lower lock excavation; and 3, excavation of part of the channel between the two locks. Atlas excavated 900,000 yards of sandstone.

Other Canit personnel on the job includes: Jacques Laberge, assistant project manager, production and efficiency; Roger Deseires, project engineer; Roger Menard, general lock superintendent; Rosario Simard, concrete superintendent; and Rene Charron, master mechanic.

A four-lane tunnel carries Highway No. 3 under the Lower Beauharnois Lock. One side of the tunnel was opened to traffic last spring as work continued on other side.

This 2½-yd. crawler crane handles concrete and helps move and set up forms.



III. Canadian Seaway Story:

St. Lambert Concreting Nears Finishing Stage

Most easterly of Seaway's locks requires 450,000 yards of concrete. McNamara-Pigott-Peacock poured 156,000 yards in one three-month period. Joint ventures also construct channel.

ST. LAMBERT Lock will be the first step ships will climb on the new St. Lawrence Seaway in 1959 as they head upstream from Montreal harbor. As you read this, concreting of the St. Lambert Lock shoud be nearly complete.

A joint venture of three Toronto (Ont.) companies, McNamara-Pigott-Peacock, is constructing the lock, which will cost about $7½ million. This same combine had the distinction of being awarded the first contract on the Seaway, for construction of 1¼ miles of channel and dike immediately below the lock. This job was essentially completed last January. McNamara-Pigott-Peacock used the same excavating equipment on the two jobs.

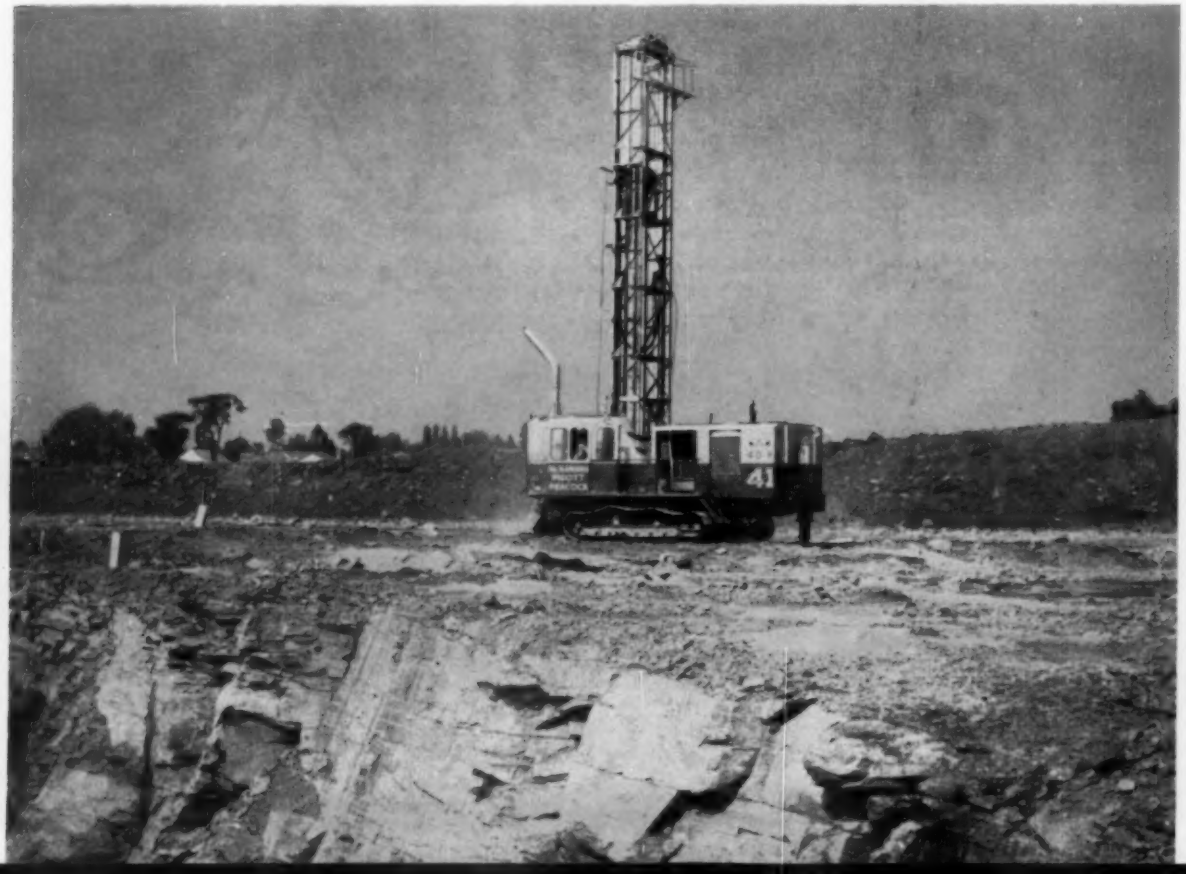
Donald Ross, a good-natured Canadian of Scottish birth and a bit of a brogue to match, is directing a concreting operation that was at nearly full capacity when *Excavating Engineer* visited the job in June. Ross is McNamara-Pigott-Peacock's project manager.

The lock and approaches will require about 450,000 yards of concrete; by mid-June, 240,000 yards had been poured.

"We've poured 156,000 yards in the last three months," said Ross, beaming. "In March, we poured 7,700 yards, got 35,433 yards in April, 66,200 in May and I estimate we'll get about 60,000 this month. Holidays slow us down in June."

First concrete was placed in June

This 6¾-in. rotary has done the bulk of the drilling on the St. Lambert job.



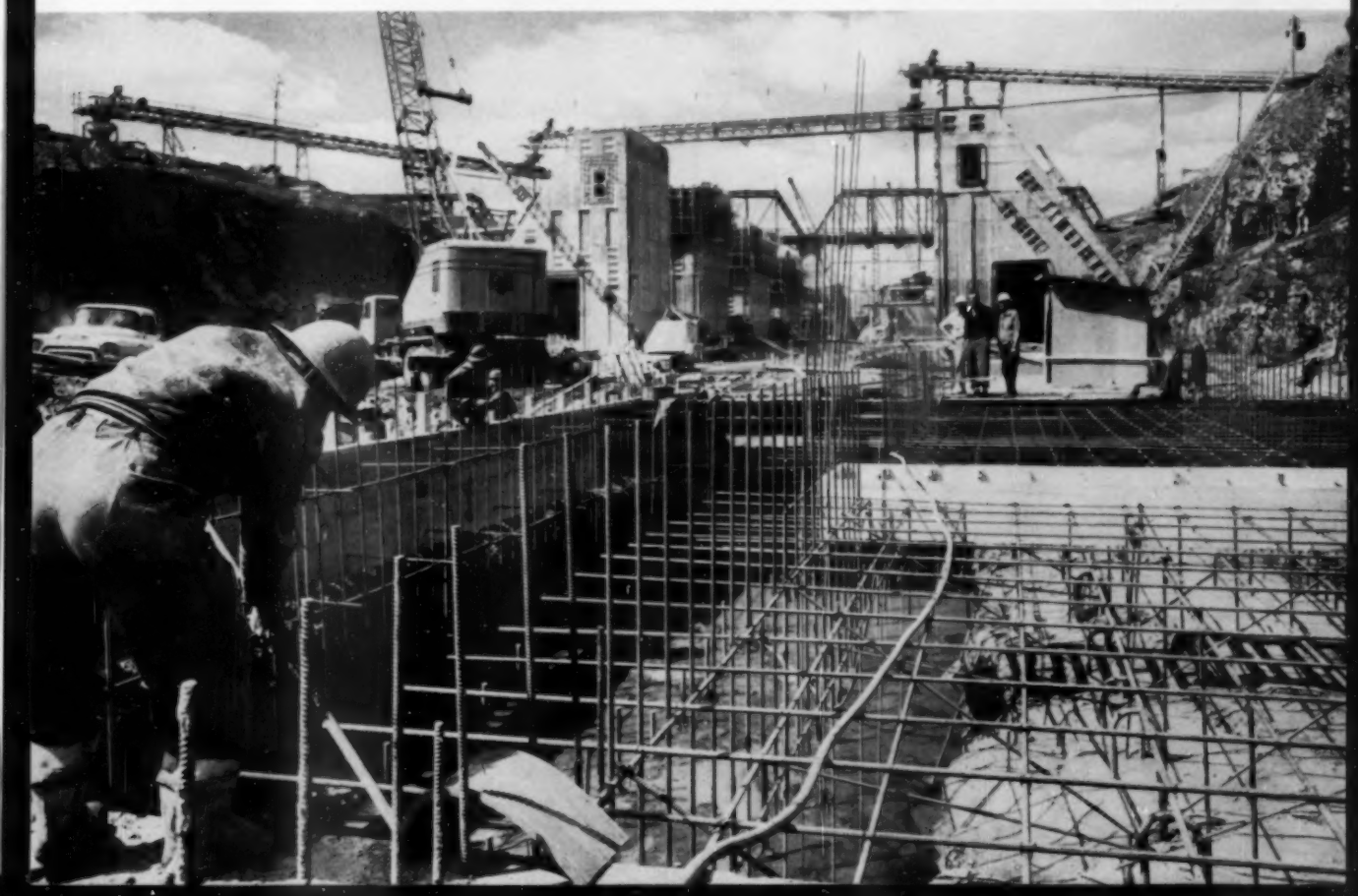
1956. A stacker, conveyor and four cranes pour into cantilever-type forms. Approximately six pours are made a day with concrete supplied from two batch plants. The largest plant, a Koehring, has two 4-yd. mixers with a capacity of 160 yards an hour. The other is a converted redi-mix plant modified for use as a wet mix setup. Its 4-yd. Koehring mixer has a capacity of 58 yards an hour.

Conveyor Fed Directly

The two mixers in the large batch plant feed directly into a 24-in. conveyor belt for delivery to a stacker with an 85-ft. boom and a series of elephant trunks. The conveyor system, which has two-speed control, works 20 hours a day, six days a week. The stacker pours 80 yards an hour. It travels on rails.

The large batch plant also fills trucks for the crane and bucket operation. The pouring cranes include a 40-ton Manitowoc, two 35-ton P&H's and a Northwest 80-D. The Manitowoc carries up to 100 ft. of boom and a 30-ft. jib. It normally handles a 3-yd. laydown bucket. The P&H's swing 2-yd. buckets, using 60 to 90-ft. booms and 20-ft. jibs. The 80-D handles either 3 or 2-yd. laydown buckets. The laydown buckets

(Above) Six crane booms are visible in this view of the St. Lambert Lock work. (Below) Reinforcing steel is set for pour.
—van der Aa photos



are fed by 4 and 6-yd. Dumpcretes. Four International 6-ton trucks haul two 2-yd. buckets to the cranes.

Ross has a "homemade" pouring method, consisting of a 24-in. conveyor mounted on a low-bed float. It has a reach of 35 feet and a pouring rate of 45 yards an hour. The belt is fed directly by 4-yd. Dumpcretes. McNamara-Pigott-Peacock's fleet includes five 4-yd. Dumpcretes on Standard GMC trucks and four 6-yd. Dumpcretes on 10-wheel GMC's.

Aggregates—a mixture of 3, 1½ and ¾-in.—are supplied by Mount Royal Paving Co., Montreal North. Standard Lime, Joliette, Que., provides the sand. Cement is hauled in three 20-ton Omaha-type cement hauling units from the manufacturing plant in Montreal East.

Jerry McCahill is acting general superintendent of the concrete work. Lawrence Yuzwak, George Erickson, Lorne Cunningham and Art DeLison are superintendents. Ray Pond is master mechanic; Ken White, concrete plant supervisor; and Tom Clarke, office manager.

The Victoria Bridge, an old railroad-highway bridge, crosses the lower section of the lock. To protect the footings, special care was necessary while excavating nearly 200,000 yards of rock from under the bridge. This required 650,000 lineal feet of close drilling.

A big, ruddy-faced man with graying hair, Bill Hart, has been McNamara-Pigott-Peacock's general superintendent of excavation for both the channel and lock jobs since the beginning of the job.

4½ Million-Yd. Excavation

The channel job—Seaway Contract No. 1—extends from the Jacques Cartier to the Victoria bridges. Excavation will total about 4½ million yards, all shale except for 300,000 yards of igneous rock. Half of the igneous rock was stockpiled for riprap. Lone remaining work on this job is removal of 80,000 yards from a road plug and 100,000 yards from a cofferdam, plus cleanup work.

The lock will produce about 2,550,000 yards of shale excavation and 100,000 yards of igneous rock.

Construction of the lock and channel is being done in the dried-up river behind a high earth-fill dike which extends far out into the river. Homes along St. Lambert's Riverside Drive no longer overlook the river; in 1959, however, they will overlook the St. Lawrence Seaway.

Most of the dike was constructed by Walsh-Canadian Construction Co., which also has the channel excavation job adjacent to the St. Lambert Lock. McNamara-Pigott-Peacock completed some of the dike work.

Little production was possible in 1954 before bad weather set in, and only 40,000 yards were excavated. Some 1,750,000 yards were excavated in 1955; 2,412,000 yards were taken in 1956. Production reached a peak of 240,000 yards a month.

Total yards excavated at the beginning of 1957 was 4,202,000. In the first six months of 1957, another 500,000 yards were added. This left about 1,200,000 yards, most of which will be excavated after concrete work has been completed.

Two 4-yd. Shovels

Hart commands an excavating fleet that at one time included four shovels. Two 4-yd. P&H 1055's have moved the bulk of the yardage. The other shovels are a 2½-yd. Northwest 80-D and a

Victoria Bridge crosses over the St. Lambert Lock. Two lift spans will be constructed at the lock. The lock and approaches will require 450,000 cubic yards of concrete.

1½-yd. P&H 655. These two machines also were rigged as draglines to move 240,000 yards on slopes.

Haul units include eight 33-ton Athey PR21-Cat DW21 haulers and six 22-ton Euclid end dumps. Five Caterpillar D8 bulldozers and a No. 12 motor grader are working.

Bulk of the drilling is handled by a Bucyrus-Erie 40-R rotary, which puts down 6¾-in. holes. A Gardner-Denver Air Trac drills 4½-in. holes. Air is provided by a G-D 500 compressor.

The truck fleet includes two 3-ton Fords and five ½-ton GMC's.

The channel cut was 41 feet. Bottom width is 225 feet with 1½ on 1 slopes. Average length of haul was 5,000 feet, Hart said. About 300,000 yards of shale were placed in the dikes. Another 2,400,000 yards were placed on slopes between the Jacques Cartier and Victoria bridges.

The 40-R has punctured the shale at the rate of 55 feet per hour. It does about 30 feet an hour in igneous rock. Average depth of hole is 43 feet. Drilling on a 25x25 pattern, the 40-R had put down 240,550 lineal feet from the beginning of the project through June. The bulk of its work has been completed until next year, when it will drill two plugs that must be removed between February and May.

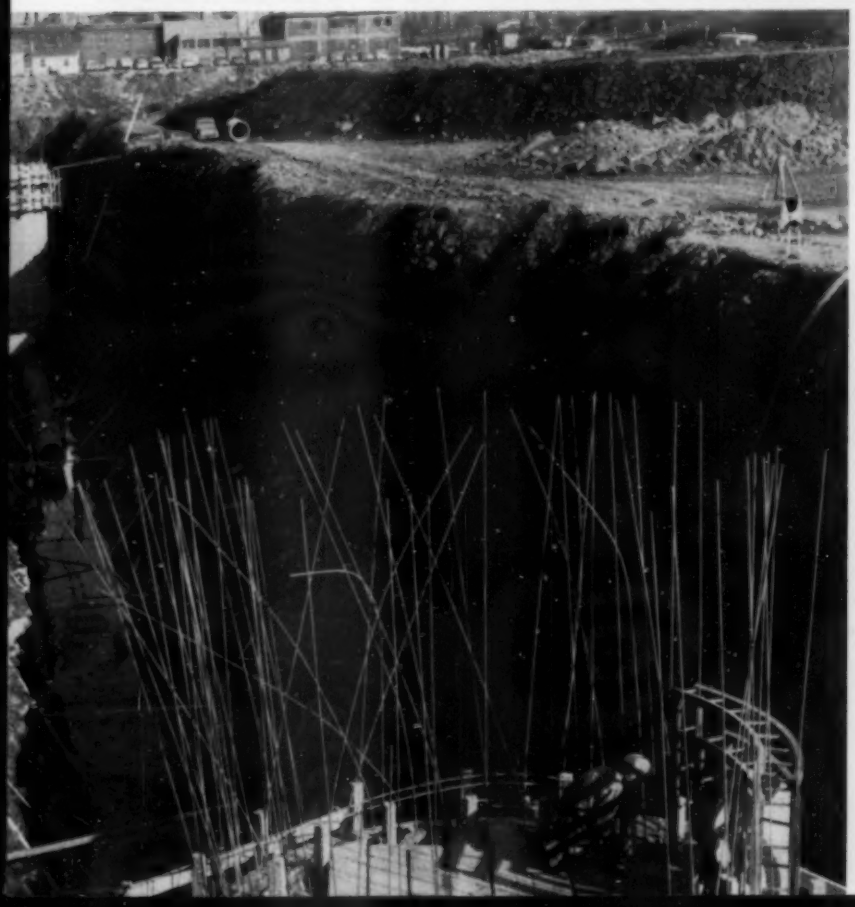
McNamara-Pigott-Peacock's blasting ratio is .44 pound of powder per yard. Each shot averages 12,000 yards. Holes are loaded to within 18 feet of the collar with Nitrone T-3 (40%). Reinforced Primacord and, in most cases, short-period delay caps are used. Used for slope work, the Air Trac drills 3-in. holes to a maximum depth of 15 feet on a 7x7 pattern.

Three Gardner-Denver D-99's and one D-123, using 2⅜-in. bits, drilled the bore holes for the close work under the bridge.

For the lock excavation, Hart has kept one of the 4-yd. shovels and one of the draglines busy for a year, complementing these with the other 4-yd. shovel and another dragline for four months. He plans to remove the plugs next winter and spring with five shovels.

A workman pulls the lever to release concrete into a form. The bucket is suspended from a crane boom. McNamara-Pigott-Peacock poured 156,000 yards in three months.

Included in McNamara-Pigott-Peacock's contract was construction of a 48-in. concrete intake for the city of St. Lambert. The intake is more than 1,100 feet long. —van der Aa photo



Shovel Loads Rip-Rap

During our visit, one of the 4-yd. 1055's was loading rip-rap to six of the Athey-Cat units. The rip-rap was being used to protect the river dike. The 80-D, rigged as a dragline, was removing footings for a concrete bridge that will cross the regulating works.

Also included on the lock contract is construction of a 48-in. concrete intake for the city of St. Lambert. The intake is more than 1,100 feet long.

Trenching on the lock contract will total about 50,000 yards, including 20,000 in igneous rock. Ken Campbell is superintendent of excavation.

Maintenance is performed in a 60x40 Butler building by a staff that includes 10 mechanics and four servicemen. Most of the general repairs are handled on Saturday and Sunday. Greasing is done in the field by two Lincoln pressure units mounted on 3-ton Fords.

Gordon McIntosh is master mechanic.

IV. Canadian Seaway Story:

Tall, Slim Cranes Pour Concrete On French Note

ONE of the most interesting phases of the Cote St. Catherine Lock construction is the manner of pouring concrete—by three tall, slim gantry cranes with a French accent.

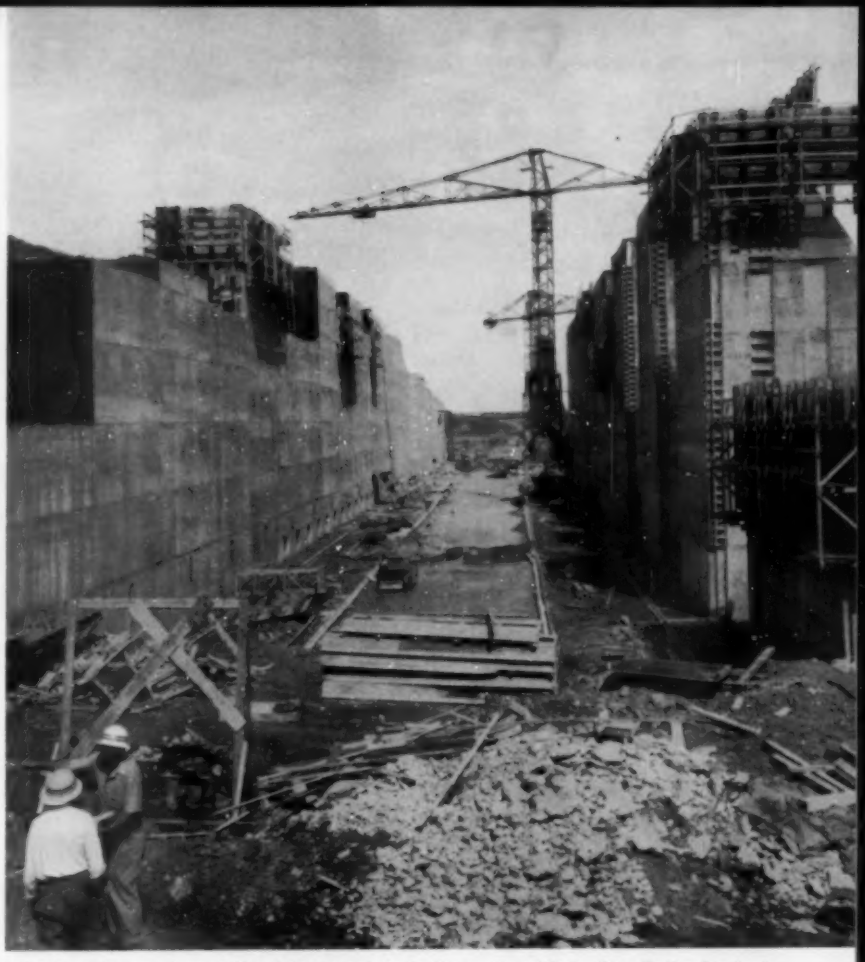
The cranes, of structural steel construction with angled brace work, are about 100 feet high. A counterweighted (concrete) crane arm extends out about 100 feet not far below the top of the tower. The cranes, which weigh 100 tons with counterweight, can lift seven tons at 50-ft. radius and 3.5 tons at 100 feet. Mounted on a 15 x 15-ft. base, the cranes travel on tracks. The operator is located in a cabin under the crane arm. A traveling cart riding aside the crane dumps concrete into buckets which the crane lifts to the top of the form and pours.

Cranes Made in France

The cranes, believed to be the first of their kind in North America, were made in Lyon, France. Many of them are working in Europe. The cranes at Cote Ste. Catherine are owned by Canamont-Canit of Montreal, which has a $7,100,000 contract to construct the lock and 10,000 feet of channel, along with a turning basin, approach walls, an upstream regulating works and three miles of dike. Canamont-Canit is a joint venture of Canamont Construction Co. and Canit Construction Ltd.

Approximately 350,000 yards of concrete will be poured in Cote Ste. Catherine Lock, which will bypass the menacing Lachine Rapids. Begun in July 1956, most of the concreting will be completed by the end of this year, said Olivier Barde, Canamont-Canit's handsome engineer.

Canamont-Canit uses three imported gantries in job at Cote Ste. Catherine Lock.



This downstream view of the rising concrete in the walls of Cote Ste. Catherine lock shows two of the three tall French gantry cranes used for pouring by Canamont-Canit.

Save for a few instances, the three gantries can handle all of the concrete pouring, Barde said. Rented cranes are used occasionally. The contractor has a special traveling form for pouring the entrance wall to its entire height of 34 feet in one lift. The pour into this form is at the rate of 600 yards in 10 hours. Designed by Canamont-Canit, the self-propelling and self-concreting form is of structural steel.

"We're pouring roughly 35,000 yards a month," said Barde.

A Johnson batch plant, containing three 2-yd. mixers, provides the concrete, which is hauled in six converted 15-ton Euclid end dumps. Used in winter to haul excavated material, the Eucs are given a complete body change in summer. They haul six yards of concrete.

Concrete is poured at Cote Ste. Catherine 20 hours a day, five days a week. Nearly 500 men are employed by Canamont-Canit.

Total excavation will be about 4.7 million yards—2.7 million of common and 2 million of shale, with some intrusions. The excavation is more than half completed. Two 4-yd. Marion 111-M shovels are on the job.

Working under the Marions are eight

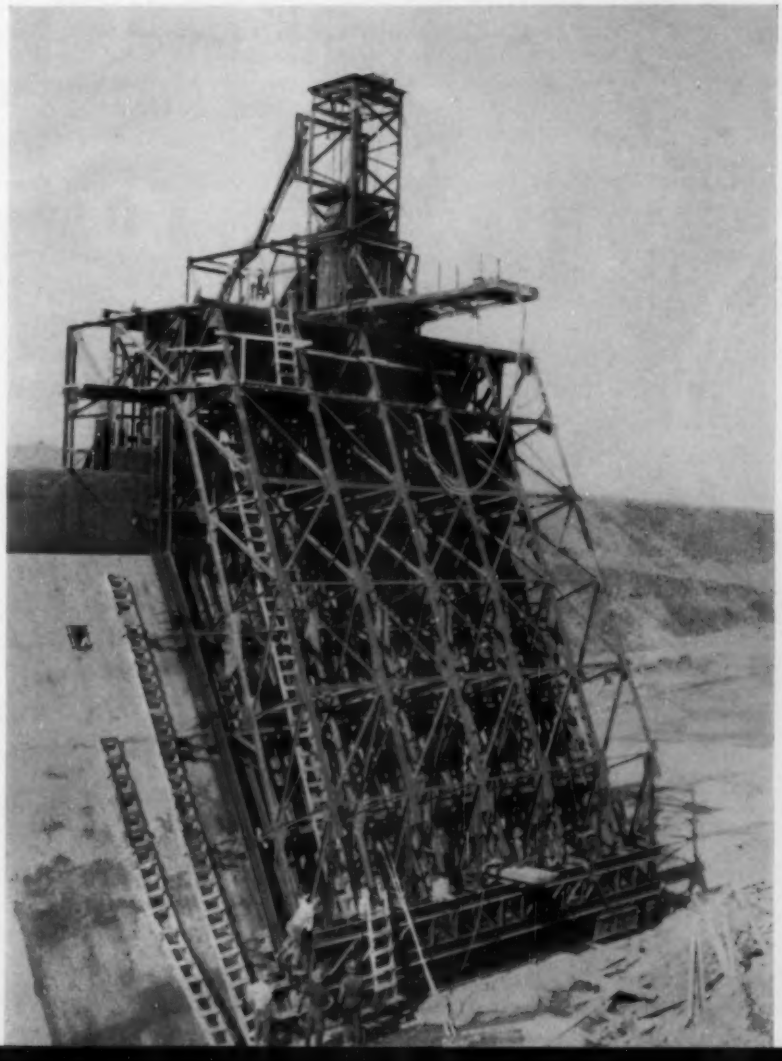
(Above) These Euclid end dumps have been converted to carry concrete. (Below) Excavated material is dumped in a waste area, where a Caterpiller dozer is leveling.

(Above) A Challenger drill puts down 3-in. holes. (Below) Workmen set form.

LeTourneau-Westinghouse Tournapulls and five 2-ton Euclid end dumps. Five Cat D8 dozers and a D6 loader are used.

Blast holes are drilled by a truck-mounted Joy, which puts down 4.5 to 6-in. holes, and a self-propelled Joy Challenger drill for 3-in. holes.

An Osgood crane with a 60-ft. boom handles miscellaneous assignments. Other equipment includes a motor grader and a water sprayer. Three Mack trucks have been converted to carry 18 tons of cement each from Montreal. Aggregates come from Montreal North.



One of two 4-yd. shovels on Cote Ste. Catherine job drops a load into a dump.

V. Canadian Seaway Story:

Iroquois Lock Work Advances

OF the five locks on the Canadian section of the Seaway, construction is most advanced at the Iroquois Lock; in fact, as this is printed, the last of 300,000 yards of concrete may have been poured into the structure. The installation of gates and other lock equipment continues, along with construction of a bascule bridge.

The walls of Iroquois lock are about 200 feet away from the wing walls of the Iroquois Control Dam, which will control the outflow of Lake Ontario 80 miles upstream.

Seaway's most westerly new lock will permit ships to bypass control dam. Both structures will be put into service in 1958 when pool is raised. Gates and equipment being installed.

Iroquois Lock will permit ships to bypass the control dam. Maximum lift will be six feet. Both the lock and control dam will be put into service in 1958 when the pool is raised. At that time, the present Galop Canal Lock and 14-ft. canal will be flooded, along with much of the old city of Iroquois, Ont. A new town has been created about a mile north of the old city, which had a population of approximately 1,500.

Iroquois Lock is being constructed by Iroquois Constructors Ltd., a partnership of these firms: The Foundation Co. of Canada Ltd., Montreal (project manager); Pentagon Construction Co. Ltd., Montreal; Rayner and Armstrong Ltd., North Bay, Ont.; Angus Robertson Ltd., Montreal; and Canadian Comstock Co. Ltd., Toronto, Ont.

The contract for a job that extends about 6,000 feet involves excavation and concrete work of the canal, upper entrance walls, gate area and lock area.

The last batch of concrete was to have been poured in September. Most of the concrete was placed by an American P-20 revolver crane with an 80-ft. range. This crane could cover all but the south lower entrance walls. Concrete for the gate walls was being placed by a Bucyrus-Erie 120-B electric crane handling a 4-yd. bucket on a 90-ft. boom. Earlier, rigged as a 6-yd. shovel, the 120-B had been used on the excavation. Some miscellaneous concrete was poured by a Northwest 25 crawler crane.

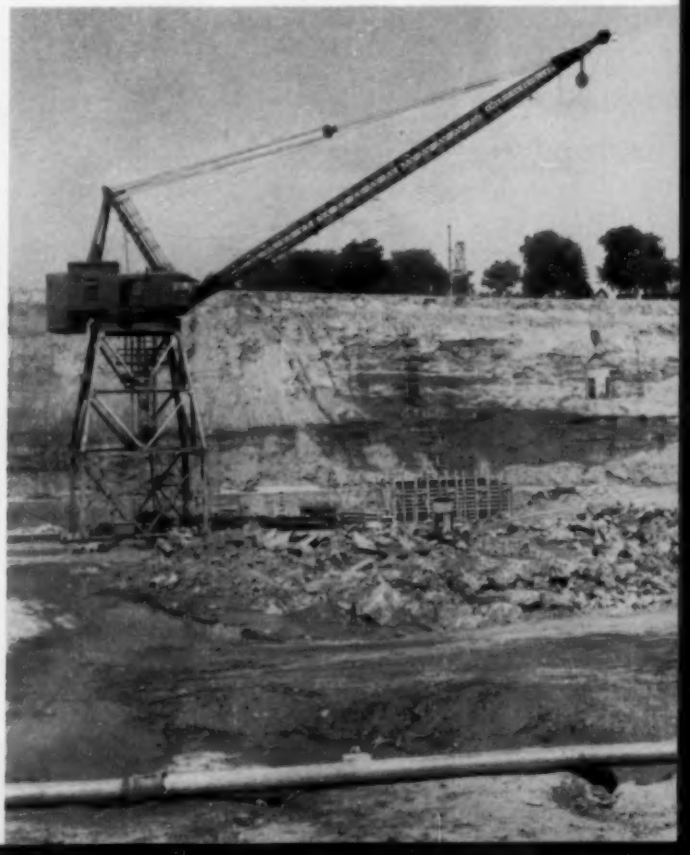
First concrete was poured in June 1956 and continued around the clock. During the winter months, the forms were tarpaulined and heated so that the temperature would not fall below 50°. Prior to placing winter concrete, the forms were heated for three or four days. After it was poured, the concrete was protected with tarps for about seven days. All aggregates from the stockpiles were pre-heated before batching.

Pours averaged about 1,600 yards a day in summer and 800 yards a day in winter. In the best single week, about 9,000 yards were poured.

Pours generally were made in 8-ft. lifts, when using wood forms. Moving steel forms, which could be altered for

Continued on page 43

(Left) Shovel with 3½-yd. dipper loads a truck in last stages of Iroquois excavation. (Right) Gantry handles concrete.



NEW MACK

heavy-duty four- and six-wheel dumpers

15- to 34-ton capacity

✻ LARGEST SELECTION OF HEAVY DUMPERS

Mack offers you the most complete line of dumpers for mining, quarrying, road building, construction. From heavy-duty 170 horsepower, four-wheel dumpers with 15-ton capacities to super-duty 400-horsepower, six-wheel dumpers with 34-ton capacities, Mack provides the economy and performance that can mean bigger hauling profits for you.

✻ CHOICE OF ENGINES

Mack offers you a choice of engines . . . Cummins diesels in the 300- and 400-horsepower class . . . or Mack Thermodyne and Cummins diesels in the 170 to 205 horsepower class. No need to alter existing maintenance facilities to handle new engine makes . . . you get the truck you want with the engine you want.

✻ OUTSTANDING PERFORMANCE

When you buy Macks, you know that you are getting top performance, outstanding economy, maximum dependability—qualities that have made Mack the acknowledged heavy-duty truck leader in the industry. Moreover, Mack dumpers are planned for accessibility throughout . . . engines are easily reached, no place in the suspension ever needs adjustment—these and many more Mack features reduce maintenance costs and make routine servicing easier. And in Macks, you get the finest transmissions and axles available . . . made by Mack and found only in Macks!

✻ COMPETITIVELY PRICED

Mack off-highway dumpers are priced right in line with competitive makes. Yet, with Macks, you get those "extras" that mean more payloads at lower hauling costs . . . cabs engineered for maximum driver efficiency . . . specially designed components with extensive use of heat-treated alloy steels . . . single-unit all-welded frames that can take plenty of hard knocks . . . outstanding performance and economy from a complete line of engines.

✻ STOCK DELIVERY

All 15 and 22½-ton Mack dumpers are available from stock. The units you want with the engines and transmissions you want can be supplied upon gratifyingly short notice. There are no delays, no production schedules for you to worry about. For more information on delivery, contact your local Mack Dealer or Representative.

MACK LRX

capacity: 15 tons

This four-wheel, off-highway dumper combines a big 15-ton rated capacity with outstanding maneuverability. Either a Mack or Cummins Diesel engine—along with heavy-duty clutch, 10-speed transmission, and Mack's Planidrive rear axle assembly—gives plenty of pulling power for long hauls on steep grades. Rugged, unified frame assembly, powerful air brakes, and comfortable cab with driver's position offset to the left assure the top performance and efficiency that have made the LRX a highly popular dumper in mine, quarry, and road-building operations.

CONDENSED SPECIFICATIONS

STANDARD EQUIPMENT

DIMENSIONS:	14.00-24 Rear Tire
Wheel Base	13′ 4″
Platform	9′ 1″
Overall Width	9′ 11″
Overall Height	10′ 8″
Overall Height (Body Raised)	18′ 8″
Overall Length	24′ 7½″
Turning Circle Diam. (To outside edge of tire)	60′
Weight (Chassis, Body & Hoist)	33,000 lbs.
Payload	30,000 lbs.

ENGINE (Diesel):

Model	END 673
Make	Mack, Thermodyne
Type	Naturally aspirated
Number of cylinders	Six
Bore and stroke	4⅛″ x 6″
Piston displacement, cu. in.	672
Brake horsepower @ 2100 r.p.m. (gov.)	170
Max. torque @ 1200 r.p.m.	480 lb.-ft.

CLUTCH (Available with END 673 only):

Type	Mack single-plate, dry
Area of engagement, sq. in.	253

ELECTRICAL SYSTEM:

Voltage and capacity . 12 V., 50 Amp. (24 V., Starting)

TRANSMISSION:

Type	Mack selective, constant mesh
No. of speeds, forward	Ten
reverse	Two

FRONT AXLE:

Make . Mack Reversed-Elliott, drop-forged I-beam

REAR AXLE:

Make	Mack Planidrive
Drive	Dual Reduction
Final Drive (3rd reduction)	Planetary gear train within wheel hubs
Total Ratio	16.5

BRAKES (Air):

Compressor	Tu-Flo
Type	Internal expanding
Front, size	17¼″ x 5″ x ¾″
Rear, size	20″ x 7″ x ¾″
Hand, size	12″ x 5″ x ⅛″, Bendix

FRAME:

Side-members, size	12½″ x 6⅛″ x ½″, wide flange I-beam, rolled section
Section modulus	60.7 (per rail)

SPRINGS:

Front, type	Semi-elliptic
Rear, suspension	Semi-rigid, axle mounted to frame

WHEELS:

Type . . . . . Cast, spoke

STEERING GEAR:

Control . . . . . Manual

TIRES:	Front	Rear
Size	12.00-24 (16P) Rib	14.00-24 (20P) Lug

CAB:

Type: Heavy-duty off-highway, closed, all-steel welded. Offset 10⅜″ to left of chassis centerline provides clear vision for driver to rear.

CHASSIS EQUIPMENT: Front and rear tow pins; air horn on cab roof; cab entrance steps and platforms; rear view mirror, left side; channel type front bumper; dual windshield wipers; vertical exhaust; stop-tail light; rim lug wrench and handle.

HOIST:

Make & model . . . . . Heil
Type-Twin, double-acting, 8″ diameter, hydraulic cylinders with 24″ stroke, 70° dumping angle.

BODY:

Type	Rock, with scoop end
Make	Heil
Capacity, line of plate	9.8 cu. yds. struck

Construction: ¼″ steel plate shell bottom; ⅜″ sides and header; ½″ wear and side bevel plates; ¼″ canopy. 3″ x 5 lb. channels between floor plates either side of a 1⅝″ edge-grain hardwood middle section filler.

OPTIONAL EQUIPMENT

ENGINE (Diesel):

Model	NHB	ENDT 673
Make	Cummins	Mack, Thermodyne
Type	Naturally aspirated	Turbocharged
Number of cylinders	Six	Six
Bore and stroke	5½″ x 6″	4⅛″ x 6″
Piston displacement cu. in.	743	672
Brake horsepower @ 2100 r.p.m. (gov.)	200	205
Max. torque @ r.p.m.	1200	1400-1600
pound-feet	537	560

CLUTCH (Included with NHB and ENDT 673):

Type	Mack two-plate, dry
Area of engagement, sq. in.	416

TIRES:	Front	Rear
Size	13.00-24 (18P) Rib	16.00-25 (20P) Lug

BODY:

Type	Flared Quarry
Make	Heil
Capacity, line of plate	11 cu. yds. struck

Construction: ¼″ steel plate shell bottom; ½″ sides; ½″ header, slope; ⅜″ header, vertical; ½″ wear plate; ⅛″ canopy. 3″ x 5 lb. channels between floor plates either side of a 1⅝″ edge-grain hardwood middle section filler.

Body Equipment: (for std. and opt. bodies)—(9) ⅛″ x 6″ alloy wear bars; rock ejectors; ½″ alloy wear plate; horizontal bolsters (3 per side); canopy, loose for export shipment. (for std. body only): exhaust heating connections; welded-on side boards.

CHASSIS EQUIPMENT: Automatic radiator shutters; Wagner "BB" (24 hour chart 0-3500 r.p.m.) tachograph, in place of standard Tachometer; speedometer; hubodometer, left front wheel; Vickers power steering; front wheel limiting valve; hand control valve to operate rear service brakes; low air pressure indicator, Wig-Wag type; screen type radiator guard; 25,000 B.T.U. hot water cab heater with defrosters; spare rim; hydraulic jack, 20-ton; air starting; cold starting equipment; insulating dash mat.

MACK — FIRST

MACK LVX

capacity: 22½ tons

This four-wheel dumper with its 22½-ton rated capacity provides maximum payloads at minimum unit cost. Equipped with either a 300 or 335-horsepower engine, over-gear transmission with two-speed compound or torque converter, and Mack's exclusive Planidrive rear axle assembly, it is powered to give top performance under the most punishing operating conditions. All-welded, single-unit, alloy-steel frame gives LVX's stamina and rugged durability. Elbow steering column, hydraulic steering booster, two-plate air-assisted clutch, and job-engineered cab with extreme left driver position assure maximum operating efficiency. From top to bottom, this big Mack gives you the "extras" that mean minimum hauling costs.

CONDENSED SPECIFICATIONS

STANDARD EQUIPMENT

DIMENSIONS:

Wheelbase	14' 2"
Platform	9' 11"
Overall Width	11' 2"
Overall Height	11' 4⅛"
Overall Length	26' 7½"
Overall Height (Body Raised)	21'
Turning Circle Diam. (To outside edge of tire)	62'
Weight (chassis, body & hoist)	40,800 lbs.
Payload	45,000 lbs.

ENGINE (Diesel):

Model	NHRBIS
Make	Cummins
Type	Supercharged
Number of cylinders	Six
Bore and stroke	5⅛" x 6"
Piston displacement, cu. in.	743
Brake horsepower @ 2100 r.p.m. (gov.)	300
Max. torque @ 1500 r.p.m.	818 lb.-ft.

CLUTCH:

Type	Mack Two-plate, dry
Area of engagement, sq. in.	416
Actuation	Manual, with air assist

ELECTRICAL SYSTEM:
Voltage and capacity . 12 V., 50 Amp. (24 V. Starting)

TRANSMISSION:

Type	Mack selective, constant mesh
No. of speeds, forward	Eight
reverse	Two

FRONT AXLE:
Type . . . Mack Reversed-Elliott, drop-forged I-beam

REAR AXLE:

Make	Mack Planidrive
Drive	Dual Reduction, spiral bevel
Final drive (3rd reduction)	Planetary gear train within wheel hubs
Total Ratio	17.66

BRAKES (Air):

Compressor	Tu-Flo
Type	Internal expanding
Front, size	17¼" x 5" x ¾"
Rear, size	18" x 10" x ¾"
Hand, size	12" x 5" x ¾"

FRAME:

Type	I-beam, wide flange
Material	Alloy steel
Side-members, size	13¹¹⁄₁₆" x 8" x ⅝" (Fabricated)
Section modulus	74.8 per rail

SPRINGS:

Front	
Type	Semi-elliptic
Suspension	Mack rubber shock insulators
Rear	
Type	Progressive rate, semi-elliptic
Suspension	Cam face slipper ends with radius rods

TIRES:

	Front	Rear
Size	14.00-24 (16P) Rib	18.00-25 (24P) Lug

WHEELS:
Type . . . . . Cast, spoke

STEERING GEAR:
Power steering assist . . . Vickers hydraulic booster

CAB:
Type . Heavy-duty off-highway, closed, all-steel, welded. Cab offset 10¼" to left of chassis centerline provides clear vision for driver to rear.

CHASSIS EQUIPMENT: Screen type radiator guard; front and rear tow pins; air horn on cab roof; dual windshield wipers; two air reservoirs; rear view mirror, left side; Mack power take-off and control (not available with Allison Transmission); door in hood side for access to oil filler and dip stick; exhaust through hood with inline muffler; channel type front bumper; stop-tail light; rim lug wrench and handle.

HOIST:
Type . . . Twin, double-acting, outboard mounted, three section telescopic cylinder assembly directly connected to body and chassis through a universal joint arrangement providing a 70° dumping angle.

BODY:

Type	Rock, with scoop end
Make	Heil
Capacity, line of plate	14.8 cu. yds. struck

Construction: ¼" steel plate shell bottom; ⅜" sides and header; ½" wear and side bevel plates; ¼" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

OPTIONAL EQUIPMENT

ENGINE:

Model	NRTO
Make & type	Cummins, turbocharged
Number of cylinders	Six
Bore and stroke	5½" x 6"
Piston displacement, cu. in.	743
Brake H.P. @ 2100 r.p.m. (gov.)	335
Max. torque @ 1500 r.p.m.	900 lb.-ft.

TRANSMISSIONS:
Westinghouse Converter and Mack 4-Speed Transmission. Clutch—2-plate, 17", air actuated.
Allison Torqmatic Converter and Allison Transmission.
Twin Disc Converter and Mack 4-Speed Transmission.

FRONT AXLE: Special Heavy-duty, Reversed-Elliott, Drop-Forged I-beam.

TIRES:

	Front
Size	14.00-24 (20P) Rib

BODY:

Type	Flared Quarry
Make	Heil
Capacity, line of plate	15.2 cu. yds., struck

Construction: ¼" steel plate shell bottom; ½" sides; ⅜" header; ½" wear and side bevel plates; ¼" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

Body Equipment: (for std. and opt. bodies): (9) ⅜" x 6" alloy wear bars; rock ejectors; horizontal bolsters (3 per side); canopy toe board; rock guards over tires; canopy, loose for export shipment. (for std. body): welded-on side boards; exhaust heating connections.

CHASSIS EQUIPMENT: Air starting, Ingersoll-Rand 9HP; Tachograph, Wagner "BB" (24 hour chart 0-3500 r.p.m.) in place of standard Tachometer; Wig-Wag low air pressure indicator; hand control valve to operate rear service brakes; front wheel brake limiting valve; 25,000 B.T.U. hot water cab heater with defrosters; windshield fan mounted on windshield header; hub-odometer; engine chrome cylinder liners and stellite inlet valve seats; insulating dash mat; fender to bumper treads; air operated radiator shutter; air operated Thermo-controlled radiator fan hub; speedometer; back-up light; hydraulic jack, 30-ton; spare rims.

NAME FOR TRUCKS

MACK LRSW

capacity: 30 tons

Powered by either a 300 or 335-horsepower engine, this 30-ton, six-wheel dumper has what it takes for off-highway operation in mines, quarries and earth-moving projects. Smooth application of power to its balanced, four-wheel drive bogie is obtained by an air-assisted clutch and overgear transmission with two-speed compound or torque converter.

Convenient location of controls, angle steering column, hydraulic steering booster, and extreme left driver position give easy and efficient handling. Best materials, precision manufacture, and specially engineered components make the LRSW capable of withstanding the toughest 'round-the-clock hauling.

CONDENSED SPECIFICATIONS

STANDARD EQUIPMENT

DIMENSIONS:

Wheelbase	16' 10"
Platform	14' 11½"
Overall Width	11' 2¾"
Overall Height	11' 6½"
Overall Length	29' 2⅜"
Overall Height (Body Raised)	24' 10"
Turning Circle Diam. (To outside edge of tire)	78'
Weight (chassis, body & hoist)	60,000 lbs.
Payload	60,000 lbs.

ENGINE (Diesel):

Model	NHRBIS
Make	Cummins
Type	Supercharged
Number of cylinders	6
Bore and stroke	5⅛" x 6"
Piston displacement, cu. in.	743
Brake horsepower @ 2100 r.p.m. (gov.)	300
Max. torque @ 1500 r.p.m.	818 lb.-ft.

CLUTCH:

Type	Mack two-plate, dry
Area of engagement, sq. in.	416
Actuation	Manual, with air assist

ELECTRICAL SYSTEM:

Voltage and capacity	12 V., 50 Amp. with 24 V., starting

TRANSMISSION:

Type	Mack two-lever, Duplex
No. of speeds, forward	Eight
reverse	Two

FRONT AXLE:

Type . . . . Mack Reversed-Elliott, drop-forged I-beam

BOGIE:

Make	Mack Planidrive
Final drive, type	Four-wheel, planetary
Inter-axle differential, type	Mack concentric cam and plunger Power Divider
Carriers	Mack Dual Reduction
Total Ratio	18.18

BRAKES:

Type and actuation	Internal expanding, inclosed, air
Front, size	17¼" x 5" x ¾"
Rear, size	20" x 7" x ¾"
Hand, size	12" x 5" x ⅜"

FRAME:

Type	I-beam, wide flange
Material	Alloy steel
Side-members, size	13 11/16" x 8" with ⅝" web and top flange, ⅞" bottom flange
Section modulus	84.5 per rail

SPRINGS:

Type, front	Semi-elliptic
rear	Semi-elliptic, inverted
Suspension, Mack	Rubber Shock Insulators

SHOCK ABSORBERS, FRONT:

Type . . . . Houdaille, hydraulic

TIRES (Lug):	Front	Rear
Size	14.00-24 (20P)	16.00-25 (20P)

WHEELS: Cast, spoke

STEERING GEAR:

Power steering assist . . . Vickers hydraulic booster

CAB:

Type . . Heavy-duty off-highway, closed, all-steel, welded. Offset 10¾" to left of chassis centerline provides clear vision for driver to rear.

CHASSIS EQUIPMENT: Hubodometer; screen type radiator guard; front and rear tow pins; air horn; rear view mirror, left side; exhaust through hood with in-line muffler; channel type front bumper; door in hood side for access to oil filler and dip stick; insulating dash mat; wig-wag low air pressure indicator; windshield wipers; stop and tail light; back up light; rim lug wrench and handle; automatic radiator shutters.

HOIST:

Make . . . . Heil

Type—Twin, double-acting, 10" diameter, hydraulic cylinders with 40" stroke, 70° dumping angle with power return.

BODY:

Make and type	Heil, Rock-scoop end
Capacity, line of plate	21 cu. yds.

Construction: ¼" steel plate shell bottom; ⅜" sides and header; ¾" slope section; ⅜" alloy wear and side bevel plates; ⅛" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

OPTIONAL EQUIPMENT

ENGINE:

Make and model	Cummins, NRTO
Number of cylinders	Six
Bore and stroke	5⅛" x 6"
Piston Displacement cu. in.	743
Brake horsepower @ 2100 r.p.m. (gov.)	335
Max. torque @ 1500 r.p.m.	900 lb.-ft.
Turbocharger	Turbine, exhaust driven

TRANSMISSIONS:

Westinghouse Converter and Mack 4-Speed Transmission. Clutch—2-plate, 17", air actuated.

Allison Torqmatic Converter and Allison Transmission.

WHEELS, TIRES:

Front & rear Wheels, type	Cast spoke
Tires, size	16.00-25
Ply-rating, front	20 or 24
rear	24

BODY EQUIPMENT: (9) ¾" x 6" alloy wear bars; 1" alloy wear plate; rock ejectors; horizontal bolsters (4 per side); twin body prop; rock guards over tires; exhaust heating connections; canopy, loose (for export shipment).

CHASSIS EQUIPMENT: Air starting, Ingersoll-Rand 9HP; chrome cylinder liners and stellite inlet valve seats; air operated Thermo-controlled radiator fan hub; Tachograph, Wagner model "BB" (24 hour chart 0-3500 RPM) in place of standard Tachometer; speedometer; front wheel brake limiting valve; alcohol vaporizer; cab insulated; exhaust outlet under cab suitable for attachment to body for body heating; 25,000 B.T.U. hot water cab heater with defrosters; solex glass for windshield; windshield fan mounted on windshield header; fender to bumper steel treads; two stop-tail lights; 20-ton hydraulic jack; spare rim.

MACK — FIRST

MACK LRVSW

capacity: 34 tons

The 34-ton rated capacity of this super-payload, six-wheel dumper assures minimum haulage costs for the big earth-moving jobs. Equipped with a 400-horsepower engine, four-speed overgear transmission, hydraulic torque converter or two-speed compound, and a balanced, four-wheel drive bogie, LRVSW's can negotiate severe grades fully loaded. Maneuverability and ease of handling are facilitated by such features as a hydraulic steering booster and air-assisted clutch. Heat-treated, stress-proportioned, single-unit frame gives the structural stamina needed to withstand severest operating conditions. All these features, and many more, contribute to unmatched durability and minimum haulage costs.

CONDENSED SPECIFICATIONS

STANDARD EQUIPMENT

DIMENSIONS:

Wheelbase	16′ 10″
Platform	14′ 11½″
Overall Width	11′ 2⅜″
Overall Height	11′ 7⅝″
Overall Length	31′ 3½″
Overall Height (Body Raised)	25′ 2″
Turning Circle Diameter (To outside edge of tire)	78′
Weight (chassis, body & hoist)	68,000 lbs.
Payload	68,000 lbs.

ENGINE (Diesel):

Model	NVH-1200
Make	Cummins
Type	Naturally aspirated
Number of cylinders	12
Bore and stroke	5¼″ x 6″
Piston displacement, cu. in.	1486
Brake horsepower @ 2100 r.p.m. (gov.)	400
Max. torque @ 1200 r.p.m.	1,075 lb.-ft.
Fuel tank and location	150 gal., back of cab

CLUTCH:

Make	Lipe Rollway
Type	Two-plate, dry
Area of engagement, sq. in.	571
Actuation	Air

ELECTRICAL SYSTEM:

Voltage and capacity	12 V., 75 Amp.
Generator, make and type	Leece-Neville, alternator

STARTING SYSTEM:

Starting motor, type	Air
Make	Bendix-Westinghouse
Rating, horsepower	25
Cold starting aid	Ether injection

TRANSMISSION:

Type	Mack selective constant mesh
No. of speeds, forward	Four
reverse	One

TORQUE CONVERTER:

Model	Westinghouse 18″
Type	Single stage, hydraulic

FRONT AXLE:
Type . . . . Mack Reversed-Elliott, drop-forged I-beam

BOGIE:

Make	Mack Planidrive
Final drive, type	Four wheel, planetary
Inter-axle Differential	Mack concentric cam and plunger type Power Divider
Carriers	Mack Dual Reduction
Total ratio	18.18

BRAKES:

Type and actuation	Internal expanding, inclosed, air
Front, size	17¼″ x 5″ x ¾″
Rear, size	20″ x 7″ x ¾″
Hand, size	12″ x 5″ x ⅜″

FRAME:

Type	I-beam, wide flange
Material	Alloy steel
Side-members, size	Depth 14¼″, flange width 8″, flange thickness 1″
Section modulus	130.0 per side

SPRINGS:

Type	Semi-elliptic
Suspension, Mack	Rubber Shock Insulators

SHOCK ABSORBERS, FRONT:
Type . . . . Houdaille, hydraulic

TIRES (Lug) Front and Rear:
Size 16.00-25 (20P)

WHEELS:
Type . . . . Cast, spoke

STEERING GEAR:

Type	Worm and roller
Power steering assist	Vickers hydraulic booster

CAB:
Type . . Heavy-duty off-highway, closed, all-steel, welded. Offset 10¾″ to left of chassis center-line provides clear vision for driver to rear.

CHASSIS EQUIPMENT: Screen type radiator guard; hubodometer; front and rear tow pins; air horn; rear view mirror, left side; dual exhaust through hood with inline mufflers; channel type front bumper; rim lug wrench and handle; door in hood side for access to oil filler and dip stick; insulating dash mat; windshield wipers; stop and tail light; back up light; automatic radiator shutters.

HOIST:

Make & Type	Heil, twin, double-acting, outboard mounted, four-section telescopic cylinder assembly directly connected to body and chassis through a universal joint arrangement to provide maximum flexibility.
Dumping angle	70°

BODY:

Make & Type	Heil Rock, scoop end
Capacity, line of plate	24 cu. yds. struck

Construction: ¼″ steel plate shell bottom; ⅜″ sides and header; ¾″ alloy wear and side bevel plates; ½″ front slope plate; ¼″ canopy. 3″ x 7.1 lb. channels between floor plates either side of a 2″ edge-grain hardwood middle section filler

OPTIONAL EQUIPMENT

TRANSMISSION (In place of 4-Speed and Westinghouse Converter):

Make & Type	Mack Two-Lever, Duplex
Speeds Forward	8
Speeds Reverse	2

TIRES (Lug) Front and Rear:
Size 16.00-25 (24P)

BODY EQUIPMENT: (9) ¾″ x 6″ wear bars over standard ¾″ alloy wear plate; 1″ alloy wear plate in place of ¾″ alloy wear plate; exhaust heating; rock ejectors; rock guards over tires; twin body prop; horizontal bolsters (5 per side).

CHASSIS EQUIPMENT: Air operated Thermo-controlled radiator fan hub; Tachograph, Wagner model "BB" (24 hour chart 0-3500RPM) in place of standard Tachometer; speedometer; front wheel brake limiting valve; alcohol vaporizer; 25,000 B.T.U. hot water cab heater with defrosters; solex glass for windshield; windshield fan mounted on windshield header; fender to bumper steel treads; cab insulated; two stop-tail lights; spare rim; 20-ton hydraulic jack.

NAME FOR TRUCKS

only MACK gives you features like these...

MACK-BUILT FRONT AXLES

Mack's reversed Elliott, drop-forged I-beam front axles are made extra strong for long, trouble-free service. Extensive use of heat-treated steels for crucial parts means minimum maintenance. Straight tie rod and rugged construction of air-actuated brake shoes insure top performance.

MACK-BUILT 2-WHEEL REAR AXLES

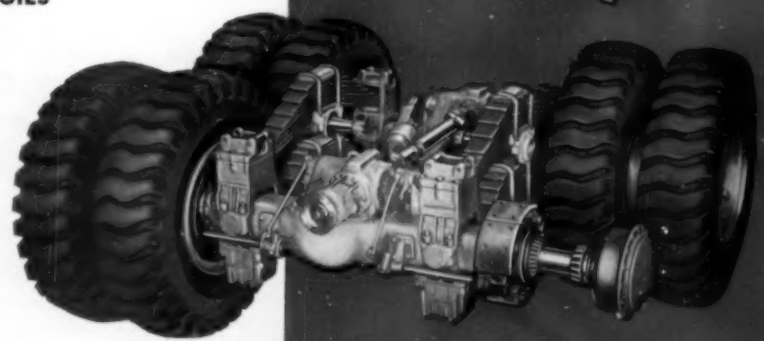
Mack's two-wheel, rear axle assemblies have an unmatched reputation for durability under strenuous service. The strongest, most wear-resistant materials are used throughout. Dual Reduction, gear-type differential and Mack's famous planetary gear reduction at the wheel hubs (Planidrive) provide the smooth distribution of power needed for top truck performance. Planetary gears can be serviced or repaired without removing tires or disturbing wheel bearing adjustment.

MACK-BUILT TRANSMISSIONS

Dependable performance and long life are standard in Mack transmissions. Shown here is the heavy-duty overgear transmission used for the LRVSW, LRSW, and LVX off-highway dumpers. The four-speed main transmission and two-speed compound are assembled as a unit to give eight forward and two reverse speeds. The four-speed main transmission without the two-speed compound is offered in combination with torque converter. All gears use Mack tetrapoid or quadrapoid tooth design and are drop-forged and case-hardened . . . gears noted for lasting the life of the truck.

MACK-BUILT 4-WHEEL BALANCED BOGIES WITH EXCLUSIVE POWER DIVIDER

Under the worst conditions of mud, loose gravel, or difficult terrain, you get maximum pulling power with Mack's four-wheel drive Balanced Bogies because exclusive Mack Power Dividers apply power to the wheels with traction. Planidrive final reduction gears in all four hubs provide needed reduction without excessively large carriers, differentials, or axle shafts. Maintenance is reduced to a minimum.



MACK first name for TRUCKS

Mack Trucks, Inc., Plainfield, New Jersey • In Canada: Mack Trucks of Canada, Ltd.

A stiff-leg derrick with a pick-up boom lowers a step leg into place at the upstream end of the Iroquois Lock chamber. Ten legs are placed at each end of the lock.

Two of these Quarrymasters drilled 4-in. holes in glacial till to 15-ft. depth.

Iroquois . . .

Continued from page 36

three different profiles, were used for the upper and lower entrance walls and lock barrel, and enabled lifts up to 37 feet to be poured with comparative ease.

Iroquois' Johnson batch plant has two 2-yd. mixers capable of producing 120 yards of concrete an hour using manufactured sand, ¾, ½ and 2-in. aggregates. Cement stored in a silo at the station in the town of Iroquois was delivered—8,000 cubic feet at a time—in the contractor's Mack and Freuhauf semi-trailer bulk cement haulers.

Eight 5-ton GMC trailer-trucks delivered concrete to the cranes in 2 and 4-yd. buckets. Hauls from the batch plant averaged from a half-mile to a mile.

Excavation of 4¾ million yards of tough glacial till and 90,000 yards of rock was begun in 1955. The original scraper fleet included six 24-yd. M-R-S-Wooldridge combinations; an M-R-S tractor pulling a 24-yd. Cat scraper; five LeTourneau-Westinghouse "C's"; and two Cat DW21 units.

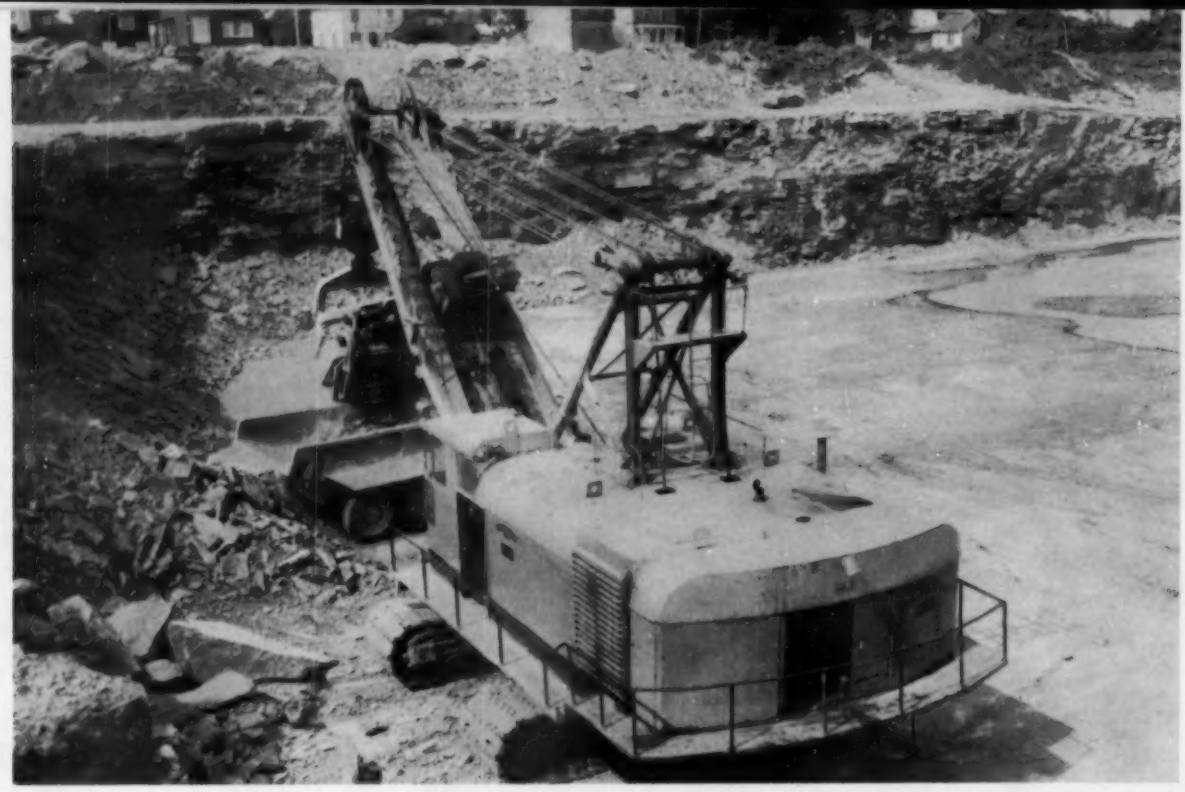
Because of the nature of the excavation, a change was made to shovel and haul units. Two 3-yd. Bucyrus-Erie 71-B shovels with torque converters were loading to 15-yd. Euclid end dumps, whose hauls ranged from a half mile to a mile. Some of the excavated material was to be used as backfill for the lock walls and for construction of two safety dikes requiring about 100,000 yards each. Average cut was about 60 feet. Several disposal areas took the bulk of the excavation.

Glacial till, which has an in-place density about equal to concrete, had to be drilled by two Ingersoll-Rand Quarrymaster rigs. They put down 4-in. holes to a depth of 15 feet on a 12x12 pattern. The holes were loaded with 4x16 Dynamex.

Five wagon drills were used on the rock, mostly limestone, to drill 2-in. holes on 2-ft. centers. Holes were loaded with 40% Forcite. A 2½-yd. Northwest 80-D backhoe loaded out the blasted rock. Other equipment on the project included six Allis-Chalmers HD-21 bulldozers, two D9's and two Vickers tractors.

Supervisory personnel for The Foundation Co. of Canada Ltd. are: L. H. Rowe, project manager; V. D. Grant, general superintendent; A. P. V. Bennett, district engineer; and D. E. McCulloch, project engineer.

A hoe cleans up bottom area between approach walls. Iroquois Lock will be the only lock on the Seaway to have sector guard gates. Other locks will have mitre gates.



Hard limestone rock on the eastern end of Miron-Mannibec's Seaway channel contract is excavated by this 6-yd. shovel.

VI. Canadian Seaway Story:

Channel Contractor Wastes No Time

QUIET St. Francis Xavier church, a mission built by the Jesuits in the 18th century, stands high and directly above the St. Lawrence Seaway channel at Caughnawaga, Que. In fact, the Seaway channel was purposely routed away from the the old stone church so that it could remain snug behind a high wall that in another day provided a means for defense. The church serves the Iroquois Indians of the Caughnawaga reservation.

Below the church, excavators, trucks, drills and other equipment raise a lot of noise and dirt as they rush to build a section of the channel. This equipment belongs to Miron-Mannibec, a joint venture of Miron & Freres Ltd. and Mannibec Construction Ltd., both of Montreal.

Miron-Mannibec's fast-paced, interesting job involves construction of 11,500 feet of channel and dike, plus construction of another 3,500 feet of rock fill at the entrance to Lake St. Louis. About 1,200 feet of Miron-Mannibec's contract is in the dry; the rest is in Lake St. Louis.

Miron-Mannibec is far ahead of schedule on job involving construction of 11,500 feet of channel, 15,000 feet of dike. Building of 6,400-ft. timber crib, sheet piling cofferdam is tricky.

The firm divided the job into stages. One stage was to excavate approximately 300,000 yards of hard limestone rock from the dry section of the eastern end of the contract. This was a job for a 6-yd. Lima 2200 shovel with a Cummins V-12 diesel engine.

The second stage involved construction of a 6,400-ft. long timber crib and sheet piling cofferdam on a rocky river bottom where currents ranged from as much as 4 to 10 mph.

This was a challenge for the Miron-Mannibec forces who had previous experience with the St. Lawrence's swift waters. They had just completed the construction of a 4,200-ft. long cellular cofferdam which closed off the north channel of the St. Lawrence to allow construction of the Barnhart Island Power Dam.

The entire Miron-Mannibec timber crib and sheet piling cofferdam at Caughnawaga was built from July through October of 1956, using 2,500 tons of steel piling and 4 million feet of timber.

The timber cribs were built in the dry, then launched and tied to a 4,000-ft. cable on a 10-ton steam winch that lowered them through the fast water to their location. When in position, they were sunk with concrete blocks, then filled with rock. The concrete blocks were recovered for further use. Algoma and Larsen piling, in average lengths of 30 feet, were driven by a floating steam derrick with a No. 7 McKiernan-Terry hammer and Cleaver-Brooks boiler. Three Bay City truck cranes also were employed in the operation.

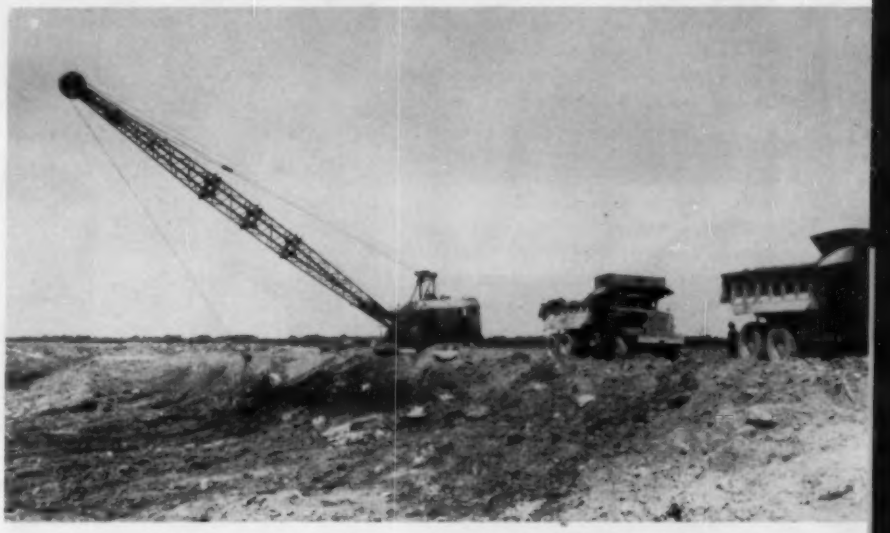
Skin and helmet divers placed con-

crete bags on the toe to seal the cofferdam.

Unwatering of the area behind the cofferdam was done in two sections with three 24-in. Stang axial-flow pumps The first section, 3,200 x 400 feet, was unwatered in five days. The second section, 3,200 x 200 feet, took more than two weeks to unwater because of winter conditions and holidays.

In addition to the cofferdam, Miron-Mannibec had to construct an additional 9,000 feet of dike, for which 600,000 yards of rock and impervious glacial till were used. The rock came from the excavation. The till was either overburden from the excavation or borrow from an island that will be eliminated. In the process of eliminating the island, another and considerably larger island for Caughnawagans will be created by Miron-Mannibec. All excavation not needed in the dikes is being dumped there or in low-flying areas in the village of Caughnawaga.

(Above) As a preliminary to pouring a 40-ft. high retaining wall, a Giraffe drills holes on 3-ft. centers for anchor bolts. (Below) A 4-yd. dragline removes sticky earth.



Excavation Totals

Overall excavation totals are 1 million yards of common and 2½ million yards of rock. Miron-Mannibec was running far ahead of schedule in June, already having excavated 2,200,000 yards. Excavation was averaging 250,000 yards a month.

"Our contract started in July 1956," Project Manager Guy Decarie smiled. "We're scheduled to complete the job in August 1958, but now I hope that we can finish by October 1957."

Average cut is 25 feet. In addition to the 6-yd. Lima, other excavators include two 4-yd. Lima 1600's, two 2½-yd. K500 Link-Belts and a 1-yd. Link-

Continued on page 70

(Left) An Allis-Chalmers HD-15 bulldozer is leveling near the dragline. (Right) This hoe trenches at foot of high wall.

"Ready on Your Call, Sir"

by Ray Day

IF you should ever place a telephone call to Redding, in northern California, you can rest assured that there's a lot of hard work behind the operator's cheerful, "We're ready on your call, sir."

For Pacific Telephone Co., which serves northern California, is extending its service lines under unbelievable difficulty. Redding is expanding rapidly with new industry.

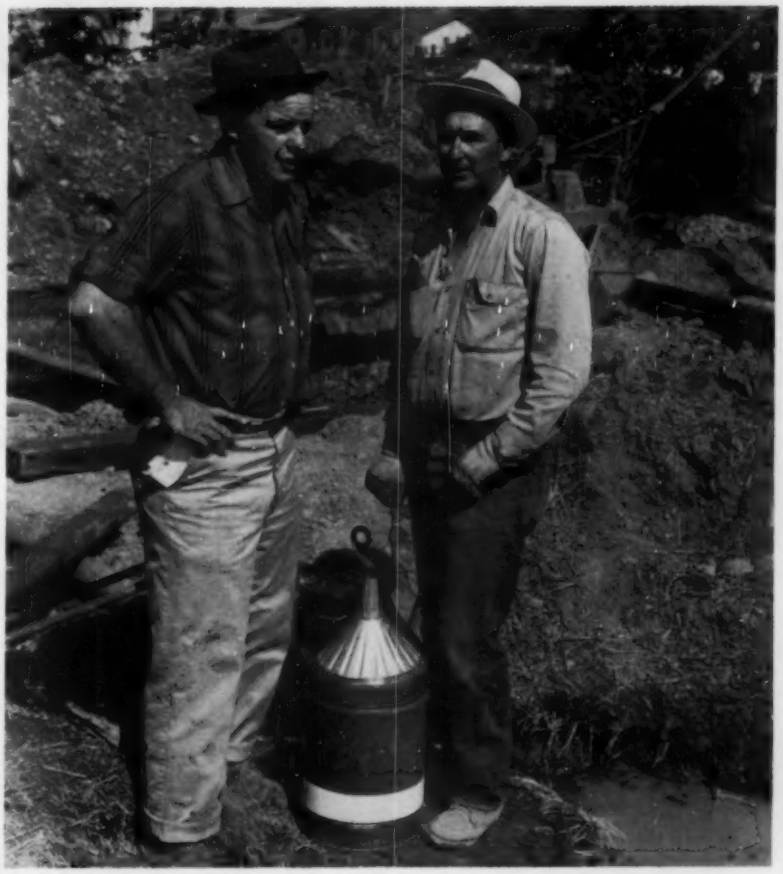
Already the impact of the nearby $225 million Trinity River Project, part of the Bureau of Reclamation's great Central Valley Water project, is beginning to add to Redding's service load. Overhead service poles are becoming heavily loaded, so that their replacement by underground service is inevitable. Imminent construction of a major service road along U. S. 99 by the California Division of Highways has caused Pacific Telephone to replace overhead poles with underground conduit. Approximately 4½ miles of this reconstruction is programmed.

Telephone crews stage real battle with waterlogged gravel to extend conduits.

To make the 170-cu. yd. excavation for a splice pit, this H-5 was backed into a cramped spot. Service manholes and splice pits are dug from 300 to 800 feet apart.

Sides of deep, narrow trenches are braced continuously by 2x12 vertical spiling; 4x4 spreaders hold the timbers.

It's a job to take a bite out of the telephone company's construction budget while testing the ingenuity of its crews. The underground location passes through bad terrain. There's a main irrigation canal on a bench above the telephone route. It's unlined. Ground formations include a lens of hard gravel and boulders, which lie just above a hardpan stratum. That makes it easy for water from the canal to leak rapidly toward lower ground. And, as if that were not enough, the formations are difficult to dig. When trench excavations are made—and they go down to eight



Boots Ingram (left) supervises use of all rented equipment and Troy Phillips is superintendent for Baldwin Contracting Co.

feet deep so future highway construction can't damage anything—they tend to cave. Continuous trench bracing often is necessary in areas where machines battled furiously just a few minutes before to get the trench dug.

The new service extension has been designed to serve Redding even if its south edge expands to many times its present size. Four-foot sections of nine-unit Gladding-McBean clay conduit are designed for the bottom of the trench. Six-unit Gladding-McBean baked clay conduit sections three feet long then lie directly over the bottom course, with joints staggered and made dirt-tight by wrapped cement bands. Ends of each clay conduit section are molded with two holes for steel dowel pins. These pins serve automatically to line the conduit sections as they are installed.

Ample Clearance

The conduit ducts are 3¼-in. x 3¼-in., I.D. This dimension allows a standard 2⅞-in. O. D. cable to be installed with clearance room for pulling. Wire sizes vary; as distance increases from the switchboard center the wires become larger. A standard 2⅞-in. cable with 26-gauge wire can accommodate 2,100 pairs; 1,800 pairs of 24-gauge and 900 pairs of 22-gauge wire fill the same cable. A modified 19-gauge system of 700 pairs of wires will be used on the outlying parts of this extension. Straight 19-gauge wire will accommodate only 455 pairs per cable.

Service manholes and splice pits are being placed from 300 to 800 feet apart. These are designed for reinforced concrete construction with field-placed concrete.

Pacific Telephone Co. organized the tough little job around a method it uses whenever jobs are especially difficult. It assigned its own supervision to direct the project. A small contract was arranged with Baldwin Contracting Co. of Redding, for furnishing labor and excavating for all manholes and splice pits. An equipment rental contract was also let to B&B Construction Co., Chico, Calif., for furnishing all necessary equipment on a rental basis. This general method allowed the greatest possible latitude in dealing with problems as they arose in the field.

Because manholes extended deeper than the conduit trench and left large side

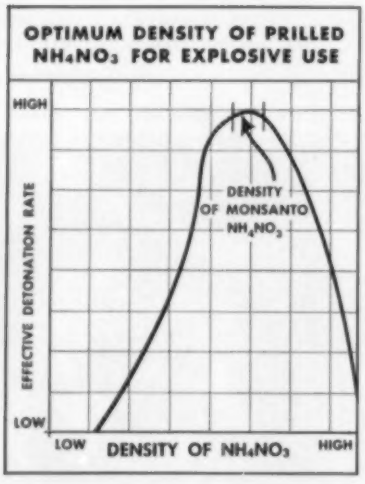
Continued on page 68

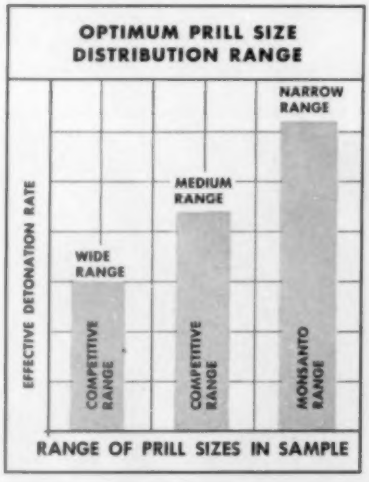
A Case 300 tractor, with ¼-yd. Davis bucket mounted fore and Davis backhoe aft, opens up a rocky 7-ft. deep conduit trench.

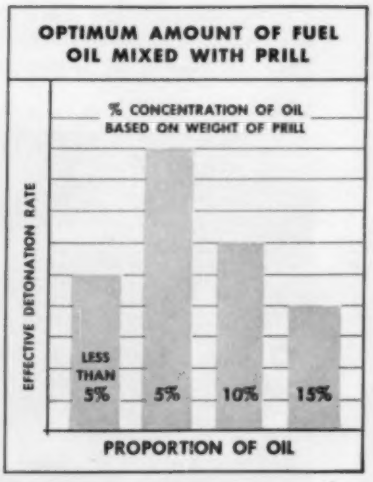
ANNOUNCING RESULTS OF USE OF AMMONIUM NIT

Monsanto is the world's largest manufacturer of prilled ammonium nitrate—and the world leader in developing the use of NH_4NO_3 as an explosive for open work. Presented here is information about the new top-quality product that Monsanto research has developed to give you the optimum in savings, safety, speed, ease of handling: Lion Brand Ammonium Nitrate for use as an explosive.

MOST EFFECTIVE NH_4NO_3 FOR EXPLOSIVE USE







LION BRAND AMMONIUM NITRATE is produced according to the specifications determined by these findings of Monsanto research. Its prill size, density, and other properties are in optimum balance to give you the most effective performance when it is used as an explosive for open work.

MONSANTO RESEARCH IN RATE AS AN EXPLOSIVE

TYPICAL SHOT WITH MONSANTO PRILLED NH_4NO_3

View of area involved in the blast. Shot was made in heavy columnar basalt at dam site.

View at time of detonation. The system of detonation recommended by Monsanto, in conjunction with Monsanto's ammonium nitrate, will yield equivalent pound-for-pound results with 60% gelatin dynamite at one-fourth the cost.

Results of blast. The powder factor in the shot above was 0.4 pounds per cubic yard. Breakage of rock was considered ideal by contractor.

Photos courtesy of MORRISON-KNUDSEN CO., INC.

IMPORTANT FACTS ABOUT MONSANTO EXPLOSIVES SERVICES

1. Leadership in ammonium nitrate explosives research now makes Monsanto the source of newest information in this field.

2. A report presenting the latest research findings on the use of ammonium nitrate as an explosive—given by Monsanto to the Mining Society of AIME, October 1957—is available upon request.

3. Monsanto's experienced staff can give you the finest, most complete technical service. The benefit of this experience is available to you. Just phone Monsanto.

4. Monsanto's Lion Brand Ammonium Nitrate is immediately available to meet your needs. Monsanto is the world's largest manufacturer of prilled ammonium nitrate.

CALL ST. LOUIS MAin 1-8900 COLLECT—OR WIRE NOW FOR COMPLETE INFORMATION

MONSANTO CHEMICAL COMPANY, Inorganic Chemicals Division
Dept. D, St. Louis 1, Missouri • In Canada: Monsanto Canada Ltd., Montreal

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News from the Field

Ammonium Nitrate Use Increases

Use of ammonium nitrate fertilizer as a blasting agent is well beyond the field test stage and has become standard with many heavy construction contractors, quarry men and strip coal mine operators, according to Tom K. Smith, Jr., director of marketing for the Inorganic Chemicals Div., Monsanto Chemical Co., St. Louis, Mo.

"This comparatively new method of open air or surface blasting has three major factors which contribute to its growing popularity," Smith pointed out. "It is extremely safe; it can be controlled by experienced powder men; and it is far cheaper than conventional blasting agents."

Ammonium nitrate fertilizer remains fertilizer until it is poured into blasting holes on the job, Smith said. There, three conditions must prevail before it becomes an explosive: it must be mixed with the correct amount of fuel oil; it must be confined; and it must be detonated by a charge of dynamite.

Because the "powder factor"—ratio of pounds of blasting agent to cubic yards of material to be blasted—is the same for ammonium nitrate fertilizer as it is for conventional blasting agents, powder men find the change to the new method of blasting an easy one, Smith said.

"Years of experience have taught good powder men how to control a blast to attain almost any desired result," he said. "They have found that they can control ammonium nitrate fertilizer just as easily as they can control conventional blasting agents."

Using ammonium nitrate fertilizer as a blasting agent in place of conventional materials can be done at a saving of one-half or more for a given job, Smith said. Ammonium nitrate fertilizer costs 3½¢ a pound; conventional blasting agents cost from 8¢ per pound upward.

Monsanto, a large supplier of ammonium nitrate fertilizer to the fertilizer manufacturing industry, has studied this new application for some time, Smith said. The company's technical men, working in the field on actual blasting operations under various conditions, have helped develop procedures for obtaining optimum results.

In addition to being used in strip mines, general blasting operations and quarries in this country, ammonium nitrate fertilizer is being used for blasting in many foreign countries, Smith said. It is being used successfully in earth, sandstone, shale, slate, dolomite, limestone, basalt, granite and taconite.

Interstate Includes Turnpikes

Marked for inclusion in the national system of interstate and defense highways are 2,102 miles of toll roads of 15 states. These include 1,837 miles already in operation, according to Bertram D. Tallamy, federal highway administrator. strator.

The 2,102 miles represent only about 5% of the total 41,000-mile length of the interstate system.

Included in the routes approved by the U. S. Department of Commerce's Bureau of Public Roads are most of the country's well-known toll roads; all or major portions of the New York Thruway, the Indiana, Kansas, Kentucky, Maine, Massachusetts, New Hampshire, Ohio, Oklahoma and Pennsylvania turnpikes and Florida's Sunshine State Parkway. Only a short section of the New Jersey Turnpike was recommended by the state for inclusion in the system.

The West Virginia Turnpike and

Continued on page 52

"I asked my new little bride to fix me a goose liver sandwich—"

Q. Why are you using only Cat-built equipment on this job?

A. "My partner and I were superintendents for one company for 10 years using all kinds of equipment. When we went into business for ourselves, we didn't consider any equipment but that made by Caterpillar. We have been 100% Caterpillar since the company was organized."

A. D. McCullen, Cunningham & McCullen, Shreveport, La.

Cunningham & McCullen knew production would be high on this 11-mile relocation job near Bunkie, La. Their spread is 100% Caterpillar. For 10 years, they had seen Caterpillar-built equipment prove itself in performance and dependability.

On this job the CAT* D6 Tractor, teamed with three DW15s, a D8 and a No. 12 Motor Grader, is moving up to 4,000 yards a day.

Now you can expect even greater production and economy. The D6, for instance, delivers 75 HP at the drawbar—*productive* horsepower because of the unit's sure-footed traction. And the D6 is equipped with the exclusive Caterpillar oil clutch which increases machine availability and reduces service and maintenance costs.

From the 48 flywheel HP D2 to the giant 320 flywheel HP D9, there's a complete line of six track-type tractors to meet your needs. Call your Caterpillar Dealer today. He will demonstrate this high-production, versatile equipment on your job. And you can count on him to back its long work life with efficient, 24-hour service and quality Caterpillar parts.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

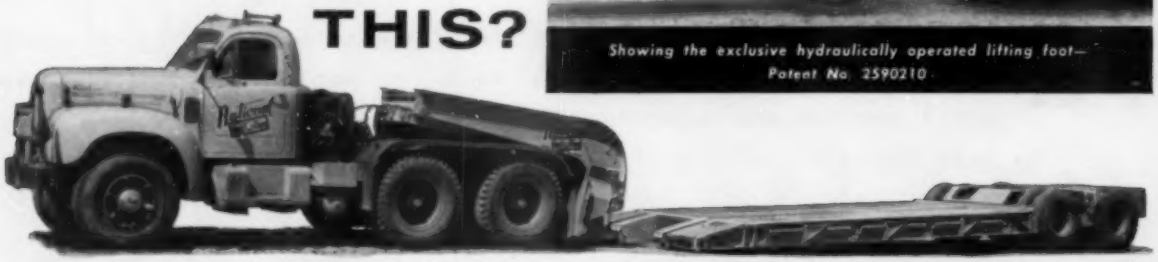
CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WANTED—
THE HARD WORK

LOW BED USERS-
'ever see a trailer LIKE THIS?

Showing the exclusive hydraulically operated lifting foot—
Patent No. 2590210



ROGERS HYDRAU-LIFT *Hydraulically-Operated* DETACHABLE GOOSENECK TRAILER

CAN YOU unload, reload and be moving again in as little as 3 minutes ?

CAN YOU load from the front without using blocking or turning equipment on deck ?

CAN YOU avoid detouring or unloading, moving ahead and reloading by traveling with front of deck lowered or raised to pass under or over obstructions ?

CAN YOU discharge overhanging loads by raising deck, blocking up load, lowering deck and pulling trailer out ?

CAN YOU raise trailer wheels to change tires or wheels of tractor while attached, to service tire or install chains ?

CAN YOU carry dippers, bulldozer blades, etc., on an unobstructed gooseneck ?

PACKY SAYS: It's almost like sitting down and letting the load slide off your back.

YOU CAN handle these operations and more with this new ROGERS Gooseneck Trailer. No winch is required saving up to $900 in cost and up to 1000 pounds in overall weight. Write for illustrated literature.

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Export Office: 50 Church St., N. Y. 7, N. Y. • *Cable Address:* "Broscites"

News . . .

Continued from page 50

Pennsylvania's Northeast Turnpike Extensions were excluded from consideration because they do not lie along the general location lines of the interstate system.

Inclusion of the 2,102 miles of toll roads in the interstate system does not affect their status as toll roads. The Federal Aid Highway Act of 1956 permits this, although no Federal-aid funds may be used for their improvement.

By the 1956 act, Congress is to determine whether the government should reimburse the states for toll roads included in the interstate system. The Bureau of Public Roads is to report the cost of such reimbursements by January 1958, but the Congress will decide if reimbursements are to be made and by what methods and in what amounts.

Case Has "School" in Vans

A complete "factory" service training school is being brought to J. I. Case Co. industrial dealers throughout the country in two 30-ft. long trailers.

Each mobile training unit contains nearly $50,000 worth of tractor assemblies and components. The Case servicemen accompanying each van present three-day courses in maintenance and service of Case TerraTrac wheel and crawler tractors and equipment in various dealer's shops. One unit now is op-

Two long trailers bring a complete service training school to J. I. Case Co. industrial dealers throughout the country. Each unit has nearly $50,000 worth of equipment.

erating in the Midwest and Far West and the other visits dealers in the East and South.

According to Hugh Seltenright, Case industrial service manager, use of mock-up, cut-away and tear-down units will enable dealer service personnel to observe the action of every important tractor component from the engine down to the hydraulic valves. Colored slides, charts and other visual aids are also used.

One of the training units is a mock-up of the counter-rotating Terramatic transmission used in TerraTrac 800 and 1000 crawlers. Also included is a complete sub-frame assembly for the TerraTrac 800.

Reclamation Plans Announced

Details of the Bureau of Reclamation's $180 million construction program for the fiscal year have been announced by W. A. Dexheimer, commissioner of reclamation. The construction program is subject to congressional action.

Construction contemplated by the Bureau of Reclamation for the fiscal year ending next June 30 will result in a water supply for 150,700 acres of land not presently irrigated and supplemental supply for 93,600 acres now receiving an insufficient supply. An additional 102,700 kilowatts or hydroelectric generating capacity will be placed in operation at multipurpose projects built in the 17 western states.

Three of the largest contemplated expenditures are: $27,540,858, Colorado River Storage Project, Arizona, Colorado, Utah, Wyoming and New Mexico; $25,454,858, Central Valley Project, California; and $13,850,000, Columbia Basin Project, Washington.

Gen. Carter Heads Commission

Brig. Gen. William A. Carter, Jr., recently was sworn in as a member and president of the Mississippi River Commission. Gen. Carter, who was appointed by President Eisenhower, also will hold the position of Division Engineer, Lower Mississippi Valley Div. of the U. S. Army Corps of Engineers. This comprises the St. Louis, Memphis, Vicksburg and New Orleans districts.

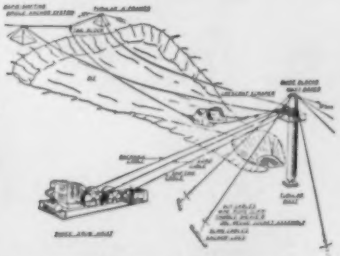
Gen. Carter will direct investigations, design and construction of flood control, navigation and other water resource works in the valley of the lower Mississippi River, from Hannibal, Mo., to the Gulf of Mexico. Annual cost of works under his jurisdiction is from $85 million to $100 million.

Profitable Bulk Material Handling Starts with a Sauerman DragScraper

digging *and hauling* to plant

This digging and hauling operation is being handled with a 3-yd. DragScraper.

This 2-yd. DragScraper is dumping river gravel dug from 50 ft. of water into grizzly feeding conveyor to plant. See *Sauerman News* No. 147.



● **THE SAUERMAN METHOD**— *showing a basic DragScraper installation. Variations of this method are Sauerman engineered to handle the toughest digging jobs at the lowest cost per cu. yd.*

A Sauerman DragScraper handles the two basic steps of material flow—digging and hauling—in one continuous operation. No double handling is required. You cut labor costs in half—or even more—because a single machine, controlled by one man, replaces the multiple equipment required by other methods.

Profitable handling is further assured by a maintenance cost of only 1¼ cents per cu. yd. for the average size Sauerman installation. On larger machines, the increased volume drops this cost still lower. You'll save money on power, too, by eliminating heavy machinery with limited handling-to-dead weight capacity. You pay only the cost of moving the actual digging tool—a Crescent DragScraper.

The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, depth and plant layout. DragScraper machines in sizes from ⅓ to 15 yds. provide delivery at the lowest cost per cu. yd.

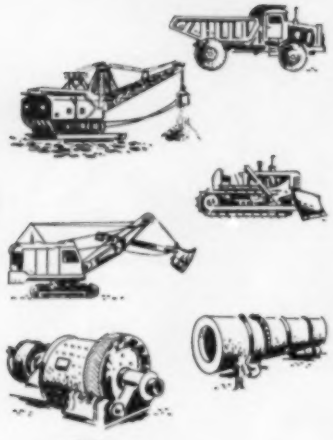
Why not consult Sauerman engineers about your plant? Their recommendations will be based on almost fifty years of materials handling and excavating machinery experience. Ask for Catalog A (DragScrapers).

SAUERMAN BROS., INC. 622 SO. 28th AVE. BELLWOOD, ILL. Cable: CABEX—Bellwood, Ill

Crescent Scrapers • Slackline and Tautline Cableways • Duralite Blocks

WANTED

YOUR TOUGH LUBRICATION JOBS



World-famous Whitmore Lubricants succeed where others fail. They are lubricants, not greases. Whitmore's exclusive never-duplicated formulas stop metal-to-metal contact—put wear on the lubricants instead of on costly gears, bearings, and cables. That's why manufacturers of earth, rock, coal, and ore moving and processing equipment recommend Whitmore Lubricants to give you the service they built into your equipment.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

OPEN GEARS, DIPPER STICKS, AND CAMS
Never-duplicated formulas that provide a hard finish impervious to moisture. Absolutely impossible for dust to cling to lubricated surfaces.

ENCLOSED GEAR CASES
Extremely high load carrying capacities for climatic conditions from the Tropics to the Arctic.

WIRE ROPE AND CABLES
Increases yardage life up to three times. Absolutely stops corrosion by penetrating to the cable core and eliminating internal friction.

Complete Line of Lubricants for Hydraulic Units; Torque Converters; Roller, Ball, and Sleeve Bearings; Speed Reducers.

Write for FREE samples, FREE data, FREE "on your job" engineering assistance.

THE WHITMORE MFG. CO.
LUBRICATING ENGINEERS
CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

Equipment You Ought to Know About

Pusher-Dozer-Ripper

Manufacturer: Balderson, Inc., Wamego, Kan.

Claims: An inside-mounted bulldozer with features making it efficient for loading scrapers, heavy-duty bulldozing and back-ripping, has been announced by Balderson, manufacturer of auxiliary equipment for Caterpillar tractors. The unit is especially designed for use with the Cat D9.

The straight blade dozer has a cutting width of 10 feet 2 inches which clears the width of the D9 tractor. The blade is ¾-in. thick with a ⅜-in. push plate reinforcement on the back. Rugged box-welded construction, a 1¼-in. x 12-in. cutting edge and Cat No. 9S end bits make it an ideal rock dozer because the narrow width allows more unit force on the cutting edge.

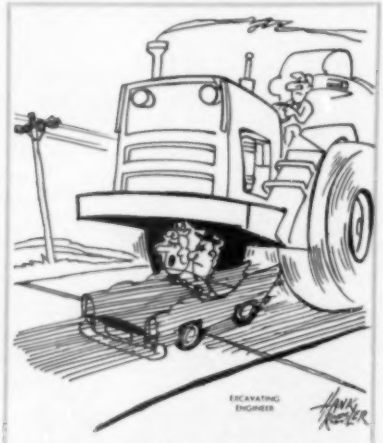
The Balderson firm uses another auxiliary manufacturer's product, the Preco back-ripper, as an optional attachment at extra cost. Two or three rippers may be built-in at the factory at the time of fabrication.

The dozer trunnions are welded under the D9 engine frame. Cat No. 9S housings and pins are used on the push beams to attach the dozer to the tractor.

Known as the Balderson model BDI9, the dozer is a compromise between a No. 9S dozer and a push plate. The blade is narrow enough to do a good job as a push plate, yet wide enough to permit a considerable amount of dozing

In road building when a cut is made against a bank, the pusher with either a straight or angling blade dozer and a push cup, tends to push the rear of the scraper away from the bank. This is due to the tractor not being able to work close enough to the bank to get a straight push on the scraper push block. This offset pushing of the tractor may be eliminated by using the BDI9 inside mounted push dozer because there are no outside push beams in the way.

The unit is built to match Caterpillar high standards of material and workmanship, and the power of the D9 tractor.



"Do you think it's going to rain? It's clouding up."

40-Yd. Dump

Manufacturer: Kenworth Motor Truck Co., Seattle, Wash.

Claims: A new Kenworth truck—probably the largest rear-dump semi being built today—is now in production. It is the 803-B with a rated pay load capacity of 64 tons or 40 cubic yards struck.

The first ten units have been purchased by Kaiser Steel Corp., for use on ore hauls at Kaiser's Eagle Mountain iron mine near Indio, Calif.

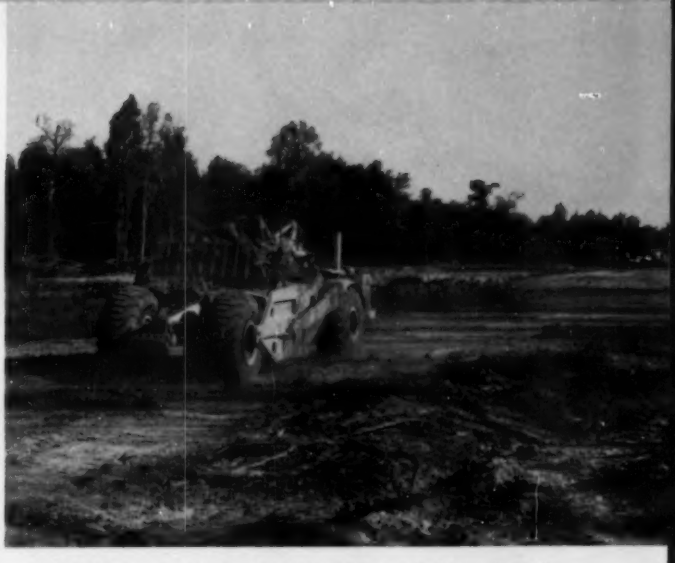
The new 803-B's gross vehicle weight rating of 228,000 pounds is indicative of the huge size of the rock and ore mover. Powered by a single 12-cylinder diesel engine, it will be offered with either a 400 or 600-hp version of this engine. The 803-B tractor has front and rear axles of Carcometal, a special high-

Continued on page 59

On Yazoo River Basin Project, Yazoo County, Miss.

PIONEER GETS HIGH PRODUCTION FROM CAT* LOWBOWL SCRAPERS

DW20-NO. 456 LOWBOWL SCRAPER is push-loaded by a giant D9 Tractor. LOWBOWL design loads more material with less resistance clear to the end of the loading cycle for quicker heaped loads.



DW21-NO. 470 LOWBOWL SCRAPER speeds heaped load on haul. Turbocharged 6-cylinder Cat Engine, also in the DW20, delivers 300 HP (maximum output)—power aplenty for working in tough conditions.

At the time these pictures were taken, Pioneer Contracting Co., Inc., Memphis, had completed 100 working days of a schedule calling for 600. The project, involving 2,045,000 cu. yd. of earthmoving on the Yazoo River Basin, covers some 7 miles of work on channels, levees, drainage ditches and road relocation. There's a fleet of Caterpillar-built units on the job, including two DW20-No. 456 LOWBOWL Scrapers, a DW21-No. 470 LOWBOWL Scraper and a giant D9. They work 24 hours a day, 5 days a week. Says Pioneer's Scraper Foreman R. C. Parker: "We prefer Caterpillar-built equipment because of ease of operation. You can also depend on them for a minimum of down time. And wherever we are, Caterpillar Dealer service is always available."

Reports from job after job show that, under identical job conditions, Cat LOWBOWL Scrapers get bigger loads faster than competitive units. Both the four-wheel DW20-No. 456 and the two-wheel DW21-No. 470 have capacities of 18 cu. yd. struck and 25 cu. yd. heaped. Their LOWBOWL design loads more material with less resistance clear to the end of the loading cycle for quicker heaped loads. And the Turbocharged 6-cylinder Caterpillar Engine delivers 300 HP (maximum output) for fast loading, hauling against adverse grades and dumping in tough going.

Whether you're a two-wheel or a four-wheel man, you can count on profitable production from LOWBOWL Scrapers. Your Caterpillar Dealer will be glad to show you competitive production facts and figures from actual jobs. Better still, name the date—he'll demonstrate on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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WANTED—
THE HARD WORK

P&H 155A *still* for all ½ yard

unsurpassed applications

The P&H Model 155A is the most versatile machine you can buy in the ½ cu. yd. class! Whether it be hoe, shovel or crane, changeovers are made quickly with the P&H *exclusive* drum arrangement. Independent swing and propel, another P&H *exclusive,* mean simultaneous motions for easier, simpler performance.

Independent planetary boom hoist is triple safe for accurate control with boom lowering always done under power. This is but one of many features on the P&H Model 155A that is *STANDARD EQUIPMENT*... and at no additional cost.

In production, the 155A is unexcelled. Built with famous P&H stability and all-welded strength, it handles maximum loads with greatest speed, safety and efficiency.

You start saving money when you invest in the P&H Model 155A... you continue to save money with minimum maintenance... you also make money because of its steady, profitable production.

HARNISCHFEGER

Construction & Mining Division
Milwaukee 46, Wisconsin

UPPER: This EIMCO 105 FRONT-END LOADER barely had its "wraps" off before being initiated into the MANAFORT BROTHERS' work force . . . clearing debris from a million dollar fire in the heart of the business district, Meriden, Conn. Says ANTHONY (TONY) MANAFORT, president: "We took a long look at the tractor-loader market and finally chose Eimco. After its performance at Meriden, we're glad we did; it fits our needs to a T."

LEFT: In New England — wherever antiquated structures are being razed to make room for modern offices, factories or dwellings . . or where there's a tough clean-up project going on . . . it's very possible you'll find MANAFORT BROTHERS on the job. And you'll likely find one (or any combination of) the MANAFORTS around to see that work is moving on schedule. Introducing them left to right: ANTHONY, brothers PAUL AND FRANK and son JIM.

"Our Eimco 105 made a 'hit' with us on the first job..."

This comment by **Anthony (Tony) Manafort** referred to the satisfaction of he, his brothers **Paul** and **Frank** and his son **Jim,** in their new **Eimco 105 Front-End Loader** after it had speedily cleared debris from a $1 million fire in Meriden, Conn.

Since it's their business to remove the "old" to make way for the "new" . . . it's normal for the **Manafort Brothers** of **New Britain, Conn.,** to do their own "wrecking." But tough, unscheduled clean-up jobs such as the Meriden fire have a way of sneaking in on a busy work calendar . . . an important reason why the **Manaforts** must continually plan for faster equipment to handle more and bigger jobs.

"We depend on our tractors to do a lot of different jobs," Tony explains, "pry-out concrete, knock down brickwork, dig and load fast, tow, push, grade . . or a dozen other things. They have to be rugged 'cause we can't afford to baby equipment to keep it working. The Eimco has given us top performance on every job."

It's easy to understand why the **Manaforts** enjoy satisfaction in the outstanding performance of their **Eimco 105.** With independent track reversal, it maneuvers fast and sharp; power shifts provide quickly responsive, precise control from full reverse to full forward speeds with a minimum of physical exertion; from his up-front position, the operator works faster with more accuracy at less strain; Eimcos stay at work without excessive, time-consuming delays for maintenance and repairs, and they offer outstanding front-end versatility for handling scores of different jobs, economically.

Let us tell you more about this busy money-maker!

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

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B-289

RUST-INHIBITOR PRIMER PAINT & HEAVY-DUTY EQUIPMENT ENAMEL WILL CUT YOUR MAINTENANCE COSTS

The PRIMER gives excellent rust-resistance, is fast-drying (30-40 min.) and forms an excellent surface for applying the Enamel. It is abrasion-resistant. Can also be used on Marine and floating equipment.

The ENAMEL is grease and oil resistant, gives high coverage and excellent color retention. Can be applied with brush or spray gun. 12 high gloss colors. Only one Primer and one Enamel coat usually needed.

Why not learn TODAY how these, and other, Robeson Products can save YOU time, money and equipment by writing

Also manufacturers of ROBESON PRESERVO, the easily applied liquid which makes tarps water, weather and mildew resistant and doubles the life of canvas.

ROBESON PRESERVO CO.—161 Merchant St.—Port Huron, Mich.

Quality Products For 60 Years

New Equipment . . .

Continued from page 54

strength cast steel. Front axle capacity is 50,000 pounds and rear axle capacity is 100,000 pounds.

Measuring 41 feet 11 inches from the front of the bumper to the rear of the single axle semi-trailer, the 803-B has a turning radius of only 37 feet with a turning angle of 30°. The tractor wheelbase is 168 inches. The double-core radiator has an area of 2,100 square inches or 2,800 square inches, depending on the engine specified. The 18:00 x 33 tires used on all axles are approximately six feet in diameter.

The Kenworth-designed drive axle is full-floating double-reduction with the first reduction a spiral bevel drive unit and final reduction through planetary gears in each wheel. Mounted in rugged frame brackets, the rear springs are positioned by the use of steel and resilient pads.

The side-by-side dual front springs are rubber-mounted at both ends and have 15 leaves per spring. Steel seats adjacent to the rubber pads at both ends of the springs shorten their effective length under load. In a loaded position, the rubber block is relieved by flattening of the spring arch. Unloaded, the front spring ends ride on rubber.

The dump body is of all-welded steel construction with strong bracing through box-section ribs and longitudinal reinforcement between the ribs at the body sides. Dumping action moves the tractor back and under the trailer as the entire trailer is raised.

The new one-man offset cab offers maximum direct vision in all directions, and is enlarged in all dimensions, providing increased headroom and increased ventilation. In addition to two front ventilators, a rear ventilating window and a hinged front quarter-window at the right side are incorporated in the cab design.

25-Ton Self-Propelled Crane

Manufacturer: Thew Shovel Co., Lorain, Ohio.

Claims: A highly maneuverable, easy-

Continued on page 62

"If what I'm seeing is right, we're going to have to blast through a couple hills."

LEADING DISTRIBUTORS

HANDLE BUCYRUS-ERIE and RUSTON-BUCY

ADEN: Luke Thomas & Co. Ltd., Crater.

ALGERIA: See French Union.

ANGOLA: Monteiro Gomes, Ltd., Luanda.

ARGENTINA: General Electric Argentina, S. A., Buenos Aires.

ARUBA, BONAIRE, & CURACAO: Prospero Baiz & Co., Inc., Curacao, N. W. I. (Drills only).

ARUBA & CURACAO: General Electric de Venezuela, S. A., Caracas, Venezuela (Excavators only).

AUSTRALIA: Ruston & Hornsby (Australia) Pty. Ltd., Adelaide, Brisbane, Clayton, and Artarmon.
Harris, Scarfe & Sandovers, Ltd., Perth.

AUSTRIA: Inglomark-Markowitsch & Co., Vienna.

BAHREIN ISLAND: John Birch & Co. Ltd., Manama.

BELGIAN CONGO: Congo Engineering Equipment Co. (CECO) S. C. R. L., Leopoldville.

BELGIUM: Tractor & Equipment Co., S. A. (TRECO) Brussels.

BOLIVIA: International Machinery Co. (Bolivia) S. A., La Paz and Oruro.

BRAZIL: Antonio M. Henriques & Cia., Manaus.
Auto Volante S. A., Belem.
Basto, Carvalho & Cia., Porto Alegre.
Carvalho S/A, Recife.
Celso Nunes, Parnaiba.
Companhia Propac, Rio de Janeiro.
Companhia Distribuidora Agro-Industrial Ltda., Fortazela.
SIMTRAL Sociedade Importadora de Maquinas, Tractores e Accessorios Ltda., Bahia.
Sociedade Tecnica de Materiais "SOTEMA" S/A, Sao Paulo.

BRITISH GUIANA: Tractor & Motor Co., Georgetown.

BRITISH HONDURAS: R. H. Eyles, Belize.

BRITISH ISLES: Ruston-Bucyrus Ltd., London and Glasgow.
Ruston & Hornsby Ltd., Bristol.

CAMBODIA: Denis Freres d'Indochine, Saigon.

CAMEROUN: See French Union.

CEYLON: Brown & Co. Ltd., Colombo.

CHILE: Grace y Cia (Chile) S.A., DIVISION INTERNATIONAL MACHINERY, Santiago and Antofagasta.

COLOMBIA: International General Electric, S. A., Inc., Barranquilla, Bogota, Cali, and Medellin.

COSTA RICA: Alberto L. Arce S. A., San Jose.

CUBA: Armando J. Valdes & Cia., Havana.

CYPRUS: The Cyprus Commercial Co. Ltd., Nicosia.

DENMARK: E. T. Grew A/S, Copenhagen.

DOMINICAN REPUBLIC: La Antillana Comercial e Industrial, C. por A., Ciudad Trujillo.

ECUADOR: M. Ribadeneira Saenz, Quito.

EGYPT: The Tractor & Engineering Co. S. A. E., Cairo and Alexandria.

EIRE & NORTHERN IRELAND: Ruston & Hornsby Ltd., Dublin.

EL SALVADOR: Casa B. Sol-Millet, San Salvador.

ETHIOPIA & ERITREA: Paul Ries & Sons (Ethiopia) Ltd., Addis Ababa.

FIJI ISLANDS: Morris Hedstrom Ltd., Suva.

FINLAND: Aktiebolaget Ekstroms Maskinaffar, Helsingfors.

FRENCH UNION

FRANCE: Ets. J. Couthon-Brunner & Marchand (E. C. O. B. E. M.), Paris.

— Their sub-distributors —

ALGERIA: Societe "IMEX", Algiers.

CAMEROUN: Compagnie Francaise de l'Afrique Occidentale (C. O. F. A. O.), Douala.

FRENCH EQUATORIAL AFRICA: C. O. F. A. O., Brazzaville.

FRENCH WEST AFRICA: C. O. F. A. O., Dakar, Senegal; Abidjan, Ivory Coast.

MADAGASCAR: Soc. F. Bonnet & Fils, Tananarive.

GERMANY: W. Strikfeldt & Co., Gummersbach, Rheinland, West Germany.

GHANA: Holman Bros. Ltd., Takoradi.

GREECE: Alec C. Triandafyllides, Athens.

GUATEMALA: Comercial MacDonald (Guatemala) S. A., Guatemala City.

HAITI: Compagnie Haitienne de Moteurs, S. A., Port-au-Prince.

HAWAIIAN ISLANDS: Theo. H. Davies & Co., Ltd., Honolulu and Hilo.

INDIA: Greaves Cotton & Co. Ltd., Bombay, Calcutta, Kanpur, Madras, and New Delhi.

INDONESIA: Lindeteves N. V., Amsterdam, Netherlands.

IRAN: Soufar Trading Co. Ltd., Teheran.

IRAQ: John Birch & Co. (Iraq) Ltd., Baghdad, Margil, and Mosul.

ISRAEL: Agricultural Engineering Co. of Israel Ltd., Haifa.

ITALY: M. I. D. E. C., Macchine Minerarie Edili ed Industriali, Milan.

JAMAICA: H. E. Robinson & Co. (Jamaica) Ltd., Kingston. (Excavators). Caribbean Industrial Equipment, Ltd., Kingston. (Water Well Drills).

JAPAN: Daiichi Bussan Kaisha, Ltd., Tokyo.

JORDAN: Nagib Baki & Sons (Transjordan) Ltd., Amman. (Drills only).

KENYA: Gailey & Roberts Ltd., Nairobi.

KOREA: American Trading Co., Inc., Seoul.

KUWAIT: T. Ward Brown, Mohamed Abdul Rahman Al-Bahar, Kuwait.

LAOS: Denis Freres d'Indochine, Saigon.

LEBANON: Nagib Baki & Sons, Beirut. (Drills only).

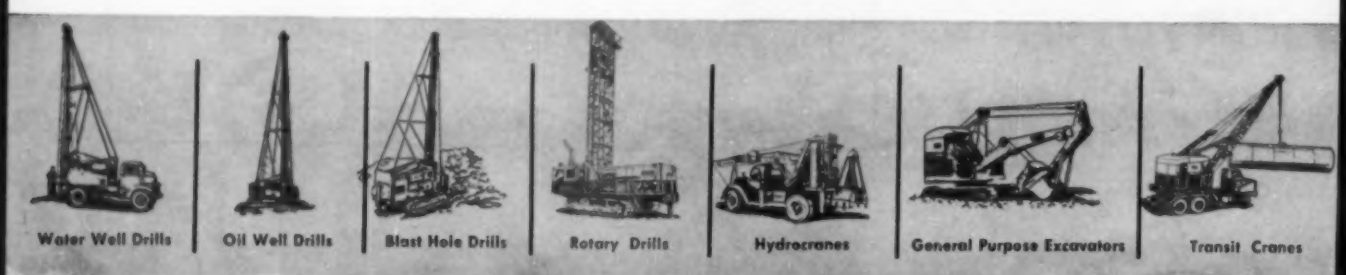
LIBERIA: Liberia Tractor & Equipment Co., Monrovia.

LIECHTENSTEIN: Robert Aebi & Co. Ltd., Zurich, Switzerland.

LUXEMBURG: Tractor & Equipment Co., S. A., (TRECO), Brussels, Belgium.

MADAGASCAR: See French Union.

MALAYAN FEDERATION: Harper Gilfillan & Co. Ltd., Kuala Lumpur, Selangor.



Water Well Drills | Oil Well Drills | Blast Hole Drills | Rotary Drills | Hydrocranes | General Purpose Excavators | Transit Cranes

ALL OVER THE WORLD

US EXCAVATORS, CRANES and DRILLS

MEXICO: Equipos Mecanicos, S. A., Mexico 5, D. F.; Chihuahua, Guadalajara, and Hermosillo.
Equipos Mecanicos del Norte, S. A., Monterrey and Tampico.
Equipos Mecanicos de la Laguna, S. A., Torreon.
Tubos y Equipos de California, S. A., La Paz. (EMSA Sub-Distributor, Territory of Baja California).
Crook Company, Los Angeles, California. (Excavators in State of Baja California).
Drilling & Mining Equipment Co., Los Angeles, California. (Water Well Drills in State of Baja California).
Bill Johnson Equipment Co., Phoenix, Arizona. (Water Well Drills in State of Sonora).

MOROCCO: Etablissements Groslin, Casablanca.

MOZAMBIQUE: Monteiro Gomes, Ltda., Lourenco Marques.

NETH. NEW GUINEA: Lindeteves N. V., Amsterdam, Netherlands.

NETHERLANDS: Wynmalen & Hausmann N. V., Rotterdam.

NEW ZEALAND: John Burns & Co. Ltd., Auckland, Christchurch, Greymouth, and Wellington.

NIGERIA: Holman Bros., Ltd., Apapa.

NORTHERN RHODESIA: Hubert Davies & Co. Ltd., Lusaka and Ndola.

NORWAY: Maskin A/S Pay and Brinck, Oslo.

PAKISTAN: Greaves Cotton & Co. (Pakistan) Ltd., Dacca, Karachi, and Lahore.

PANAMA: Guardia y Cia S. A., Panama.

PARAGUAY: General Electric Argentina, S. A., Buenos Aires, Argentina.

PERU: International Machinery Co., Lima.

PHILIPPINES: G. A. Machineries Inc., Manila.
Lilestone & Co., Inc., Manila.

PORTUGAL: Monteiro Gomes, Ltda., Lisbon.

PUERTO RICO & VIRGIN ISLANDS: Ulpiano Casal, Inc., San Juan, Puerto Rico.

SAAR: Ets. J. Couthon-Brunner & Marchand (E. C. O. B. E. M.), Paris, France.

SAUDI ARABIA: The Arabian Trading Co., Jeddah.
John Birch & Co. (Saudi Arabia) Ltd., Damman.

SINGAPORE: Harper Gilfillan & Co. Ltd., Singapore.

SOUTHERN RHODESIA: Hubert Davies & Co. Ltd., Salisbury, Bulawayo, and Gwelo.

SPAIN (incl. Colonies): Gummersindo Garcia, S. A., Madrid.

SUDAN: Sudan Mercantile Co. (Engineers) Ltd., Khartoum; Sudan Mercantile (Wad Medani) Ltd., Wad Medani; Sudan Mercantile (Port Sudan) Ltd., Port Sudan.

SURINAM: J. F. D. Haenen Co. Ltd., Paramaribo.

SWEDEN: Tornborg & Lundberg A/B, Stockholm.

SWITZERLAND: Robert Aebi & Co. Ltd., Zurich.

SYRIA: Barada Trading & Engineering Co. S. A., Damascus. (Drills only).

TAIWAN: Wayfoong & Co., Taipei.

TANGANYIKA: Gailey & Roberts (Tanganyika) Ltd., Dar es Salaam.

THAILAND: Gerson & Sons Ltd., Bangkok.
Harper Gilfillan & Co. Ltd., Kuala Lumpur, Selangor.

TRIESTE: M. I. D. E. C., Macchine Minerarie Edili ed Industriali, Milan, Italy.

TRINIDAD: Neal & Massy Engineering Co., Ltd., Port-of-Spain.

TUNISIA: MINE-USINE et COMPTOIR DES MINES Reunis, Tunis.

TURKEY: Said Dormen ve Ort, Istanbul.

UGANDA: Gailey & Roberts (Uganda) Ltd., Kampala.

UNION OF SOUTH AFRICA & SOUTHWEST AFRICA: Hubert Davies & Co., Ltd., Johannesburg, Bloemfontein, Welkom, Durban, East London, Port Elizabeth, and Capetown.

URUGUAY: General Electric, S. A., Montevideo.

VENEZUELA: General Electric de Venezuela, S. A., Caracas, Maracaibo, and Puerto La Cruz. (Excavators).

VIETNAM: Denis Freres d'Indochine, Saigon.

YUGOSLAVIA: Intercommerce, Belgrade.

Capacities Available

General Purpose Excavators and Cranes — ⅜ to 4 cubic yards (0.28 to 3.1 cubic meters) capacity.

Hydrocranes — 5-ton crane (4.5 metric ton): ⅜ cubic yard excavator (0.28 cubic meters). 10-ton crane (9.1 metric ton): ½ cubic yard excavator (0.38 cubic meters).

Quarry and Mine Shovels and Draglines — 2½ to 8 cubic yards (2 to 6 cubic meters) capacity.

Stripping Shovels — 2 to 65 cubic yards (1.5 to 49.7 cubic meters) capacity.

Blast Hole Drills (Cable Tool) for 6, 6⅝, 9, and 12 inch (150, 170, 230, and 305 millimeter) holes.

Blast Hole Drills (Rotary) for 6¾ to 9-in. holes (170 to 230 millimeters); for 9⅞ to 12¼-in. (250 to 310 millimeter) holes.

Walking Draglines — 4 to 33 cubic yards (3.1 to 25.2 cubic meters) capacity.

Railway Cranes — 160 and 250 ton (145 and 227 metric ton) capacity.

Water Well Drills for depths of 500, 1000, and 1500 feet (150, 305, and 455 meters).

Oil Well Drills for depths of 1500, 2500, 3500, and 6000 feet (455, 760, 1070, and 1830 meters).

82Y57C

BUCYRUS ERIE

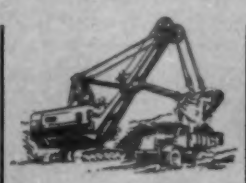
RUSTON — BUCYRUS

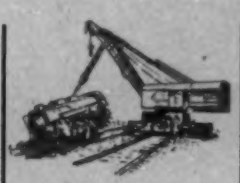
BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin, U.S.A.
and
RUSTON-BUCYRUS, LIMITED
Lincoln, England

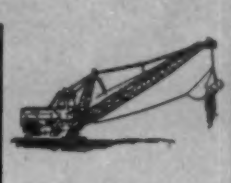
●

World's Largest Manufacturer of Excavators and Cranes

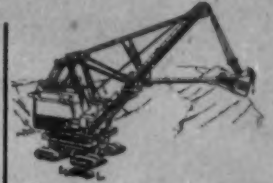
Crawler Cranes


Quarry & Mine Excavators

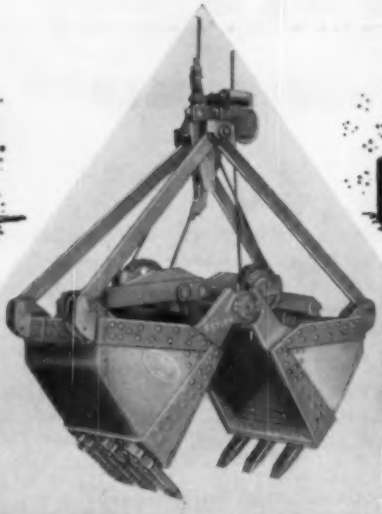

Railway Cranes


Walking Draglines

Dragline Buckets


Stripping Shovels

YESTERDAY



TODAY

BUCKETS CHANGE TOO

KIESLER LEADS WITH THE MIGHTY Mighty Ice Tong Principle THE WAY . . . ICE TONG PRINCIPLE!

There's no doubt about it: whether you are excavating, rehandling coal, sand, crushed stone, or slag, you want a bucket that DIGS DEEP AND DUMPS FAST! And for THE bucket that DIGS DEEPEST and DUMPS FASTER — AT NO ADDITIONAL COST — the name is KIESLER!!

The reasons for that PROVEN claim are these: the exclusive shell design of all KIESLER buckets . . . while designed to hold the greatest loads . . . gives a sharper dumping angle so that dumping begins the instant that the jaws start to open (not only when they are wide open). This affords the operator spot dumping . . . avoids spillage . . . and thus . . . reduces handling costs to a minimum.

Equally important, KIESLER buckets — and only KIESLER applies the age-old principle of leverage through BOTH lever arms. Thus power is applied EQUALLY to BOTH shells . . . without unnecessary parts to the line, with less cable, without extra dead weight.

The results: a bucket that DIGS DEEPER and DUMPS FASTER . . . a bucket that will still be in operation after other buckets are junked.

GUARANTEE

Kiesler Buckets are guaranteed to outperform and do a bigger day's work than any other Bucket of equal weight, width and size, when properly reeved and operated.

JOS. F. KIESLER Co. Since 1892

944 W. HURON ST. • CHICAGO 22, ILL. • MOnroe 6-7144

New Equipment . . .

Continued from page 59

to-operate, 25-ton self-propelled crane has been added to the Lorain line of power shovels and cranes.

The SP-425 model has a newly-designed larger cab for increased operator comfort, more inside "move-around" space and maximum visibility.

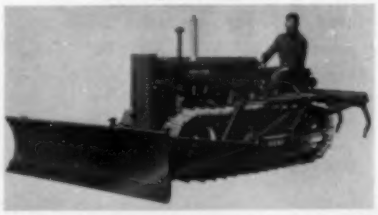
Air controls of the carrier for maximum maneuverability and reduced operator effort provide automotive-type air-power steering; air brakes; air-assist travel; air shift on travel-selector; and air shift of travel gears.

The 6 x 4 carrier, specially designed for heavy-duty self-propelled service, utilizes a heavy-duty, spring-mounted dead front axle of tubular design and provides for non-scuff, dual front wheels of the differential type. Tires are 11:00 x 20, 12-ply. It has four travel speeds in both directions.

A torque converter power take-off is available. It provides a highly efficient and smooth application of engine power to turntable operations. The converter adjusts automatically to the loads or operating needs of the machine and the engine cannot be stalled due to any operating circumstances. Throttle control of load lowering provides a high degree of precision control and variable speeds in the raising and lowering of crane loads.

The rear counterweight is easily and quickly detached for over-the-highway travel.

Henry Bulldozer



Manufacturer: Henry Mfg. Co., Inc., 1700 N. Clay St., Topeka, Kan.

Claims: Henry has introduced a newly-designed bulldozer for use with the John Deere 420 crawler tractor. Two

models are available: the Henry angle tilt dozer ATD-1 and the Henry straight dozer SD-1.

Both dozers are designed with box steel push beams, outside mounted to insure against springing blade edges. Henry has placed the beam pivot point below the center line of the tractor.

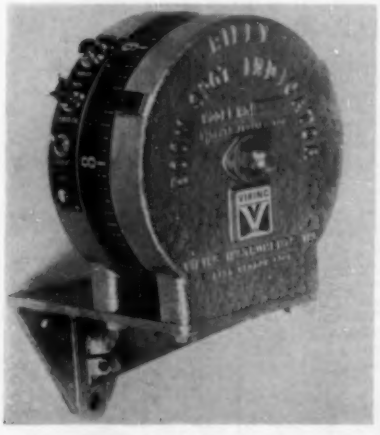
The Henry dozers operate from the tractor's hydraulic system with a single valve. Float position makes leveling easy.

The cutting edge of the blade, made of heat-treated high carbon steel, is reversible and replaceable. The specially-curved moldboard rolls dirt ahead.

The angle tilt blade is 96 inches long. It has a 24-in. high moldboard and a 6-in. high cutting edge. The ATD-1 angles 25° to right or left. The blade tilts nine inches. Double-acting 3½-in. cylinders shove the blade to a depth of 10 inches below grade, or raise it 52 inches above ground.

The straight dozer blade goes to a depth of 15 inches below ground and lifts 42 inches above. It is 72 inches long. Large pins and replaceable bushings are used throughout.

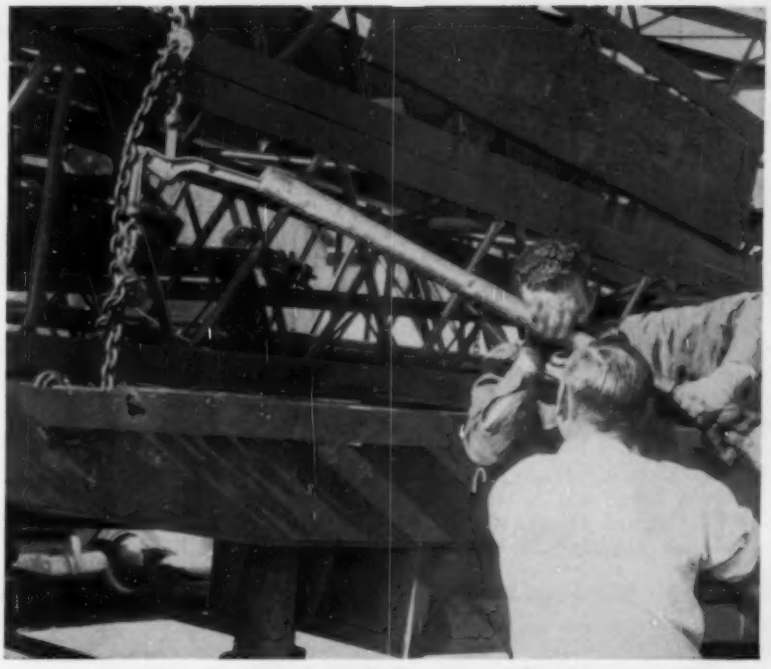
Boom Spot Indicator



Manufacturer: Viking Instruments, Inc., East Haddam, Conn.

Claims: Viking says that its new boom spot indicator eliminates the costly manual multi-handling operations predominate in such work as sheet setting, casing work, blind sighting, loading and unloading. Viking said that the instrument, which was invented by a boom rig operator, leaves "no margin for error" in difficult boom rig operations where reproducible spotting is an important factor. It says further that the chance of the operator passing his boom from the safe operation zone into

Continued on page 66



THIS LOAD WILL STAY PUT . . . ACROSS TOWN — ACROSS COUNTRY

There's no doubt about the safety of this load—or any load secured with Lebus Loadbinders. Completely drop forged, then heat treated for even more strength and durability, the millions of Lebus Loadbinders already in use have proved their ability to tie down loads of every description—keep them absolutely secured without failure *until they're released!*

You get an idea of this loadbinder's strength from the photo above. Two big truckers throw their combined weight on a long cheater without fear of breaking or bending any part—they know that, from handle to hooks, the Lebus is the strongest Loadbinder manufactured. You're assured of safe, dependable performance because each Loadbinder is thoroughly proof tested before shipment.

Equally important is the Lebus Loadbinder's convenience and safety of operation. Once the binder is locked in position, it can't snap open. Even shifting loads won't spread the handle! Exclusive Lebus designed ball and socket swivel is drop forged—won't pull apart regardless of the load! Get complete details on the number one loadbinder in every industry from Crosby Laughlin Lebus Distributors!

WORKERS PROTECTED

Workers and materials are protected with Crosby-Laughlin Safety Hooks that keep the load in place *until it's released!* A rust-proof, non-jamming latch and spring provides a simple but safe method of keeping rings and slings

on the hook, even when the load is set down! Tough Crosby-Laughlin Hooks are drop forged then carefully heat treated. The result is superior strength and quality from a design that eliminates excess weight. Crosby-Laughlin safety and standard hooks are available in eye, hoist, shank and swivel types to give you the exact design you need. Capacities range up to 20 tons! See your nearby distributor for catalogs and technical information on a complete line of fittings!

Stocked and sold by leading distributors everywhere

CROSBY-LAUGHLIN *Division*

FT. WAYNE 1, INDIANA

NOT in the Contract

Two young things were discussing the possibility of another war.

"If there is another one, they'll be over here bombing before you know it, and we'll all be blown into maternity."

"You're right," said the other young thing. "And with the blackouts, we'll never know who did it."

Little boy in woodshed: "Father, did grandpa spank you when you were a little boy?"

Father (with paddle): "Yes, my son."

Little boy: "And did great-grandpa spank grandpa when he was a little boy?"

Father: "Yes."

Boy: "Well, don't you think with my help you could overcome this inherited rowdyism?"

A snobbish rich man drove up to the front of a hotel, in a Ford Thunderbird. The doorman gave him a parking check for the car and got in to drive it away.

"Do you know how to handle these high powered cars?" the snob snapped.

"Yass, sir," he grinned. "I sho do—it's just a little ole Fode."

A comely coed met her aunt downtown on Saturday night and was given her aunt's paycheck to take home. On the way she was held up.

"Help! Help! I've been robbed!" she cried. "Someone has taken my aunt's pay!"

A policeman quieted her. "Cut out the pig Latin, girl, and tell me what happened."

Speaking of bosses reminds us of this one:

"Where's my pencil?" asked the boss.

"Behind your ear," answered the steno.

"Come, come, I'm a busy man. Which ear?"

They call her "Switchboard." When she walks, all her lines are busy.

Asker: "What were you in the war?"

Veteran: "A private."

And so Diogenes blew out his lamp and went home!

A real cool cat walked into a diner and asked for some apple pie.

"The apple pie is gone," the man behind the counter informed him.

"Craazy, man! Craazy!" the cool one replied. "I'll take a nice thick slice!"

The two young neighbors were comparing notes while shopping at the supermarket.

"My husband is a salesman," said one. "He's away so much that when he gets back he seems like a stranger."

"My," exclaimed the other, "how thrilling."

She: "Kiss me once more like that and I'm yours for life."

He: "Thanks for the warning."

"Sir, er, that is, I would like to—" stammered the nervous suitor to his girl's father. "I mean I have been going with your daughter for five years—"

"Well, what do you want," said the father, "a pension?"

"Get up," commanded the Irish cop.

"I can't offisher," replied the Scot.

"Two men ha' got me down."

"Nonsense!" snorted the policeman. "I don't see any men holdin' ye down."

"They are, too," insisted the reclining one. "Their names is Haig and Haig."

In one southern state particularly, rural folk are great patrons of a matrimonial agency. One sharecropper, desirous of finding a wife for his son, went to this agent, who handed him a list of eligible lady clients. Running through this sheet, the man came upon his own wife's name, entered as anxious to obtain a husband.

Forgetting about his son, the man hurried home to announce his discovery to his wife. She took it in her stride.

"Yes," she said. "I done give him my name. I puts it down when you was so sick in de winter and de doctor he says we must prepare for de worst."

Then there was the old lady who had three cats: Fluffy, Tuffy and Paderewski. Fluffy was the fluffiest, Tuffy was the toughest, and Paderewski was the pianist.

"I hear you mugs are desperate for engineers."

JOB REPORT FROM GOLDSBORO, N. C.

on the new CAT* DW15 (Series E)-No. 428 LOWBOWL Scraper

Whenever a new machine is introduced, this question comes up: "What'll it do on a job?" Reports from actual jobs in different sections of the country show there's a definite answer for you on the new Caterpillar DW15 (Series E)-No. 428 LOWBOWL Scraper. Compared with competitive units of similar capacity, this new earthmover heads the pack with high production.

Here are facts and figures from a contract on U. S. Highway 117 near Goldsboro, N. C. The contract, handled by S. T. Wooten Construction Co., Stantonsbury, involved moving about 3,000,000 cu. yd. of material in a section 2.3 miles long. The material was coarse, moist sand (70%) and clay (30%). Hauling loads of 14.1 bank cu. yd., the DW15 (Series E) unit averaged 7.02 round trips an hour on a 3,600-foot cycle. Details are shown in the box to the right.

From every angle, the new DW15 is designed for high production at low cost per yard. Its Caterpillar Engine packs 200 HP (maximum output capacity). With speeds up to 37.2 MPH plus the stability of four wheels, it delivers fast round-trip hauls with greater safety than two-wheel rigs. Its new wide-section 26.5 x 25 tires provide maximum flotation. And the new No. 428 LOWBOWL Scraper (13 cu. yd. struck, 18 cu. yd. heaped), provides a faster loading rate clear to the end of the loading cycle.

For comparative cost-of-operation figures on other actual jobs, see your Caterpillar Dealer. He's a source of reliable information. Ask him to show you proof that the new DW15 (Series E)-No. 428 can pay off for you! Name the date—he'll demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

JOB DATA ON DW15 (SERIES E)-NO. 428*

Material: Coarse moist sand (70%) and clay (30%)	
Round-trip distance	**3,600'**
Average load time (min.)	**1.06**
Average haul time	**3.28**
Average turn and dump time	**.61**
Average return time	**3.61**
Average cycle time (incl. delays)	**8.56**
Average trips per hour	**7.02**
Bank cu. yd. per trip	**14.1**
Average hourly production (bank cu. yd.)	**99**

**The unit was push-loaded by a D8*

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.

THE LATEST, MOST COMPLETE INFORMATION ON THE NEW HIGHWAY PROGRAM — FREE

Here in one booklet is *all* the latest information on the new highway program. Find out how, where and when the money will be spent; standards for the new freeways, final routes of the Interstate System. Everything you need to know to share in the greatest construction job in history.

DEPT. EE-10, Caterpillar Tractor Co.
Peoria, Ill.

Please send me immediately ____ copies of "The Road Ahead."

Name _____

Company _____

Address _____

City _____ *Zone* ____ *State* _____

GET 59% MORE LIGHT OUTPUT...

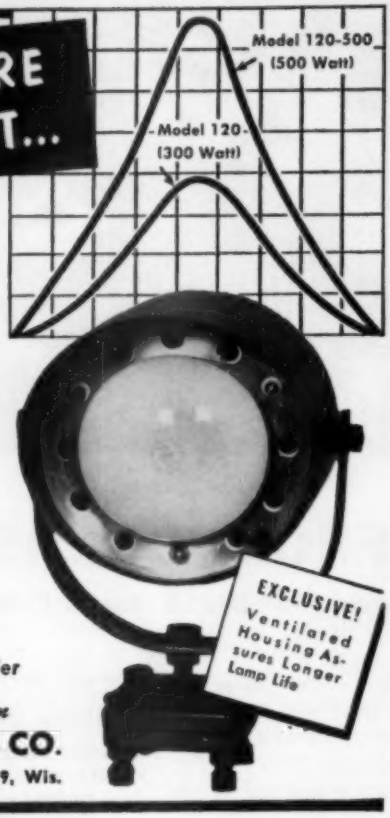
From Model 120 500 Watt

STURDILITE
FLOOD LAMP

- Steps up night-time production —
- Adds to SAFETY! . . .
- Especially Adapted for Operations Such as Open Pit Mining, Stripping, Dredging, Excavating, Crushing and Mix Plants, Logging, Road Building, Drilling, Quarrying, Etc.

WRITE For Illustrated Folder

Metal Spinning Division
PHOENIX PRODUCTS CO.
4723 N. 27th St. • Milwaukee 9, Wis.



There's Something
NEW
Coming From
BUCYRUS ERIE
NEXT MONTH!
428E57b

New Equipment . . .

Continued from page 63

any degree of the danger zone is eliminated.

The indicator is adaptable to all types of boom rig cranes. Easily read by the operator, the indicator is mounted in the cab house. It is controlled by a cable attached to the boom which gives the operator a numerical reading of the boom angle at all times. An integral signal light unit provides a red flasher warning when the boom is about to enter the danger zone. The light unit also provides illumination for night operations.

Scarifier-Ripper Scraper

Manufacturer: Seaman-Gunnison Corp., 2763 S. 27th St., Milwaukee, Wis.

Claims: A utility scraper with a scarifier-ripper as an integral part of the machine is now available.

The scarifier can be lowered hydraulically on the back haul to rip the soil for loading runs. It also can be used as a counterweight for better traction and stability.

Balance of the close-coupled, short-wheelbase unit assures traction to absorb full engine torque.

The new scraper is especially designed for reducing earthmoving costs on jobs too small to justify the cost of larger, more costly equipment. It is well within highway limitations for both overall width and axle loadings. The unit can make 180° turns on a 22-ft. roadway. Its capacity is 4.5 cubic yards struck, and 6 yards heaped.

The self-loading scraper is powered by an International 650 diesel tractor modified as an 88-hp, two-wheel prime mover. All steering and scraper controls are hydraulic. Five speeds range from 2.4 to 21 mph. Maximum cutting depth is four inches; the spread is from 2 to 14 inches. The utility scraper cuts a 7-ft. width. Weight without load is approximately eight tons.

The scraper also can be obtained with a 65-hp prime mover, a modified International W 450 diesel, providing 10 speeds forward (from approximately 1.6 to 17 mph) with torque amplifier. This unit is a self-loader, but may require pusher assistance under difficult loading conditions.

Gear Lubricant

Manufacturer: Whitmore Mfg. Co., Cleveland 4, Ohio.

Claims: A new lubricant called "Handi-Lube" liquid gear composition is now available in a 16-oz. pushbutton aerosol container for handy application to open gears and sliding surfaces.

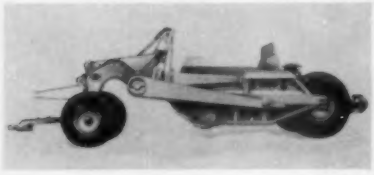
The tough protective film is sprayed on the pressure side of a surface from a distance of 12 to 18 inches. It eliminates harmful metal-to-metal contact and increases gear life by putting the wear on the lubricant instead of metal.

The lubricant is weatherproof and will not break down even after prolonged use under water.

To provide the correct open gear lu-

brication under all climatic conditions, the liquid gear composition is available in light, medium and heavy types. It is non-toxic and has no disagreeable odor.

13-Yd. Scraper



Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

Claims: A new Lowbowl design scraper is now available for use with the Caterpillar D7 tractor.

The new, four-wheel No. 435, which replaces the No. 70 scraper in the company's line, incorporates many operational and dimensional features which result in higher production and lower cost per yard of earth moved.

As with the other Caterpillar Lowbowl scrapers, the low silhouette of the No. 435 allows material to enter the scraper with a minimum of lifting effort and material-to-material friction. On a comparative basis, the No. 435 scraper offers 38.6 square feet of bottom area to 31.9 square feet for the No. 70, an increase of 6.7 square feet. This increase helps to provide the new unit with a struck capacity of 13 cubic yards, an increase of 27% over its predecessor model.

Because of its additional width, the No. 435 scraper provides a broader base for heap loading, and can transport 18 cubic yards of heaped material.

Due to the benefits of Lowbowl design, the No. 435 has greater capacity even though the height of its sides is 2 inches lower than those of the No. 70 scraper. To assure thorough, positive ejection, the No. 435 is designed with an ejector of increased height and greater apron opening. Protection against fouling of the draft arms due to rock spillage over the scraper sides is afforded by the incorporation of rock guards as standard on the new unit.

Another advantage of the low silhouette of the scraper is greater stability, due to the lowering of the loaded units center of gravity. Additionally, the wider base of the scraper increases the width of cut to 9 feet 4 inches from the previous model's 8 feet 6 inches.

From the standpoint of versatility, the No. 435 is large enough to be economically used with the Cat D8 and also the D6 tractor.

OWEN
Engineering scores again
Never before have so many important and improved features been combined in a bucket as in the new OWEN "SCL" wide-type materials handling clamshell bucket . . . redesigned from bowl to head.
OUTSTANDING IS THE 75% TO 100% INCREASE IN CABLE LIFE.
Here's how it's done. The closing line now leads straight through the center plane of the head of the bucket to first lower sheave, thus eliminating bending of the closing line around upper guide sheaves as in conventional block and tackle and lever arm buckets.
Reinforced arms and crosshead afford greater durability without adding weight to bucket. Available in sizes ranging from 3/4 to 3 cubic yards inclusive.
Write today for additional information.
The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

In a Hayward, there's no contact between the closing mechanism and the gravel or other materials handled. To be sure—this "no contact" feature is only one advantage. But a very important one to you—since it means much less wear, reduced upkeep, and a significant dollar-saving in bucket maintenance.

The Hayward Company, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES

famous for performance since 1888

Conduit . . .

Continued from page 47

areas exposed to caving and ground water, their construction called for speed, precision and ingenuity. It was absolutely impossible to leave excavated splice pits open for any length of time; caving filled them up too fast and the inflow of ground water was too serious a problem.

To introduce all possible speed to this operation, Baldwin Contracting Co. rented a Bucyrus-Erie H-5 Hydrocrane and hydraulic-closing clamshell bucket from Kirch Steel Co. of Redding. Ordinarily Kirch Steel uses the H-5 for structural and building steel erection, and for placing concrete in bridges and foundations. When the rig is idle between jobs, Kirch Steel makes it available to other contractors on a rental basis.

The H-5 lived up to its expectations. Operated by Fred Kirch, the machine excavated 170-cu. yd. splice pits through gravel and boulders in only about five hours.

Contractors School

NAME .....

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CITY .....

Learn how to figure labor, material costs on construction jobs. Write for 30 day free trial.
173 LAKE AVE., GREENWICH, CONN.

The unique hydraulic closing feature of the clam bucket made it possible to dig the corners square. This was done by maneuvering the clam in close, socking one lip into the ground and the other against the bank at the pit corner. Bucket action then was exactly the same as a dragshovel. On straight digging in the center of the pit the bucket picked up ⅝-yd. heaped loads every cycle. With its Diamond T tandem drive truck mounting and telescoping hydraulic boom, the machine moved easily from excavation to excavation despite the presence of trees, the ever-present overhead telephone line, and numerous laterals leading perpendicularly to homes and business establishments nearby.

Unwater Pit

Before digging started, carpenters framed a square digging area of proper size (usually 14 feet) with 8 x 8 fir timbers. As digging proceeds, pumps are put in to unwater the pit. Ordinarily two Homelites and a Jaeger 4-in. mud-sucker-type diaphragm pump are used. But where a pit must be left overnight, early-morning unwatering is done by a CMC 4-in. centrifugal pump.

Side forms of driven wood sheeting are set quickly after excavation is finished. Reinforcing steel and the inner wall forms go in. The concrete then is placed by mixing hauled-in gravel, sand and cement with a small mixer. The forms are pulled, waterproofing is applied to the exterior concrete and backfill is placed as soon as possible.

Trench excavation, too, has been a headache. Few formations have been easy, even those assigned to a Parsons 255 trenching machine. It excavates a 26-in. wide ditch, full depth, in formations of sand, gravel and small cobbles.

Dig 7-Ft. Trench

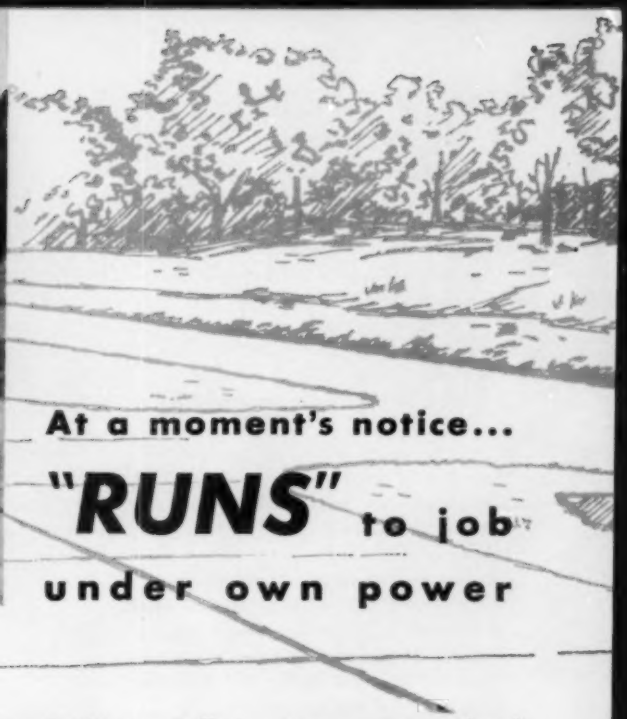
For heavier digging in well-bedded boulders up to 12 inches in size, B&B Construction Co. is furnishing a new Case 300 rubber tire tractor, equipped with digging machinery fore and aft. A Davis ¼-yd. scoop is mounted on the front end; a Davis backhoe is mounted on the rear. The backhoe, which is used for rockiest trenching, will dig up to 11 feet deep. When *Excavating Engineer* visited the job, a 7-ft. trench was being dug, and the machine was making about 30 feet an hour.

Continuous bracing is done just behind trench excavation. It consists of 2 x 12 vertical spiling with three 8-ft. longitudinal 2 x 12 wales spaced top, bottom and center. Heavy 4 x 4 timber spreaders hold the timber tight against the trench walls. The spreaders are placed with an assist from Duff-Norton trench jacks.

A Davis scoop on a John Deere tractor is doing some excavation and placing the 12-in. pea-gravel leveling course cushion on which the tile conduit sections rest. The gravel is leveled by hand raking, and the clay conduit pieces are dropped down by manila rope and a leather harness. Fastened by the dowel

Continued on page 70

A Jaeger 4-in. mud sucker-type diaphragm pump does an excellent job of keeping the hole dry. High ground water table made constant operation of pumps necessary.



At a moment's notice...

"RUNS" to job under own power

In less than 4 minutes, speedy LeTourneau-Westinghouse Tournatractor® travels a mile under its own power to your next job. This mobile machine drives anywhere — at rubber-tired speeds — via highway, or cross-country. Big, low-pressure tires do not damage pavement, curbs, sidewalks or RR tracks. You need no planking to cross blacktop. In moving into any new project, you save time, bother, and expense of, a) shipping by rail, or; b) of locating a low-bed trailer . . . moving in extra men and extra transport equipment . . . loading, blocking, unblocking and unloading.

Not only does 210 hp Tournatractor get to your jobs faster . . . it also finishes them sooner. Four speeds forward to 17 mph and two reverse to 7 mph help you complete most tractor assignments in as little as half the time that it takes the average crawler-tractor.

Figure for yourself what these advantages mean in savings to you:

1. Greater speed on the job; completes each assignment faster.

2. Roadability; cuts moving costs, and non-pay hours of moving time.

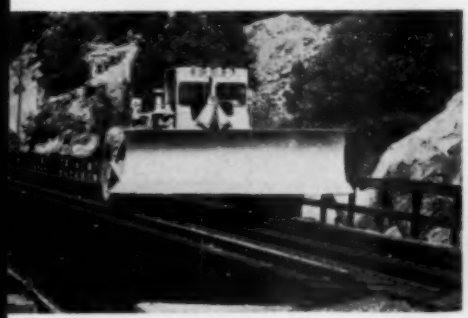
3. Fast one-man moves; makes it easy to keep Tournatractor profitably busy at all times, lets you fill in with small jobs between big ones with no idle-time losses.

4. Rubber-tired tractor's long range drive-yourself mobility and versatility; lets you move with the seasons, keep busy the year-around.

Tournatractor has proved itself in every climate, under all sorts of weather conditions. It can save YOU time and money. Write or phone for more information on this versatile, high-speed tractor-on-rubber.

CT-1333-DC-1

A major western railroad uses their rubber-tired Tournatractor for fast emergency slide-clearing service. Rig follows tracks . . . over trestles . . . thru tunnels . . . or travels by highway. Big, low-pressure tires do not damage track, ties, switches, or trip block signals.



Tournatractor often goes where other tractors would bog down. Full-sealed wheels, flywheel-mounted generator and electric motors are not affected by water or dust . . . nor heat or cold. Lubricants do not wash out because oil and grease fittings are water tight.

Owners send Tournatractor job-to-job with confidence. They know its easy-to-handle electric-power controls, and big 4-wheel air brakes, enable Tournatractor to maneuver easily in tight quarters, without interference to traffic. Tractor often tows own fuel and supply trailer.

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Conduit . . .

Continued from page 68

pins, they line up perfectly. A wrapping of fibre material and ½ inch of cement mortar, wrapped wet around each joint, makes them dirtproof.

Backfill is being placed by the front end scoop on a Ford tractor. Good material free of boulders must be worked around the conduit until it's covered. Then the cobbles are permissible. The bracing is of course removed and hauled ahead for resetting.

All in all, the closely organized job was making good progress—about 500 feet per day—when all the difficulties are considered. Completion of the project, scheduled for midsummer, meant that the entire south section of Redding now could expand all it wanted with the telephone system to serve the area already in. The job exemplifies what utilities companies all over the nation are doing to meet increased service demands.

Pacific Telephone Company's supervision was under Art Stanley and Earl Sowell, district supervisors. Boots Ingram is supervising the use of all rented equipment, and Troy Phillips is in charge for Baldwin Contracting Co.

WATCH

For

Announcement

of

438E57d

NEXT MONTH

BUCYRUS ERIE

Seaway . . .

Continued from page 45

Belt. They load into a fleet of 45 Mack end dumps—19 of 30 tons, eight of 22 tons, 4 of 15 tons and 14 of 10 tons. Average length of hauls is 3,000 feet. Tractors include three Allis-Chalmers HD-15 dozers and two HD-9G front-end loaders and a Cat D7 dozer. An Allis-Chalmers grader maintains haul roads.

Use Throw-Away Bits

Heavy drilling is done by two Joy Champion rotaries putting down 6¼-in. holes with Joy-type bits and a Gardner-Denver 4½-in. drill using Timken bits. Two Joy track drills sink 2½-in. side slope holes, using throw-away bits. Timken carbide bits are used on a Gardner-Denver Air Trac sinking 2½-in. holes.

Excellent bit life was reported by Ron Merrifield, Miron-Mannibec's equipment manager, who said that Timken carbide bits were giving at least 15,000 feet of service.

Timing Well Controlled

Because of the church, timing on blasts is well controlled. Holes are drilled by the Joy rotaries on a 15 x 15 or 18 x 18 pattern to depths ranging from 18 to 28 feet. The holes are loaded with Nitrone T-4 canisters. Primacord and MS connectors are used.

A 3-ft. thick retaining wall, 40 feet high and 1,000 feet long, is being built below the church as additional protection. It will require 9,000 yards of concrete. A Giraffe drilled holes on 3-ft. centers for anchor bolts. Pigtails were grouted in. Close drilling for the wall was done on 9-in. centers by wagon drills setup on wooden runways.

Water Intake Constructed

Also included in the contract is construction of a 500-ft. long, 36-in. diameter water intake for the village and a reinforced concrete bridge, 25 feet wide and 150 feet long, connecting the new island with the mainland.

Among Miron-Mannibec's pumps are a 14-in. Worthington, five 10-in. Marlows, three 8-in. Marlows, two 6-in. Marlows and four assorted 3-in. pumps.

A field service shop is maintained for field repairs, but all component repairs are handled by Miron & Freres' well-equipped shop in Montreal. Two lubrication stations are situated on the job site—one at the main station and one in the field. A field lube truck serves semi-stationary machinery.

The project is under the management of J. D. Stirling Ltd., Montreal, sponsors for the Miron-Mannibec joint venture. The work is under the direct supervision of Guy Decarie as project manager. Albert Brazeau is project superintendent; Lucian Simpson, excavation superintendent; and Fred Bossons, office manager.

A Mack end dump deposits excavated material from the dragline into dike. Miron-Mannibec is constructing 11,500 feet of channel, approximately 15,000 feet of dike.

How to boost pit output... cut handling costs

Short turn radius of Rear-Dumps allows quick spotting in restricted areas. Low rear-entry and wide bowl provide easy target for shovel operator... make for fast dipper swing-out, let shovel operator heap maximum yardage without spillage.

The use of modern LeTourneau-Westinghouse Tournapull Rear-Dumps on your pit hauls can cut cycle time, boost production, and lower operating costs. Here's how:

Greater maneuverability — Positive electric power steer, through geared kingpin, permits prime-mover to pivot at right angles for short 90° turns. As a result, unit makes continuous U-turn in less space than Rear-Dump's own length. In dump position, it turns in only about ⅔ of overall length!

There's no need for turntables or elaborate turn-around areas. You spot faster at the shovel, dump faster, and get away faster from pit or dump. On the haul, you make hairpin turns with safety — complete cycles faster. Time saved adds up to extra trips per shift, greater production... with no increase in manpower or equipment investment.

Speeds loading — Low, wide bowl permits shovel bucket to swing in low for faster loading. It permits quick bucket swing-out, even while dipper-door is still open. And because of large target area, spillage is greatly reduced. Production delay during the day for clean-up of pit floor is minimized.

Dumps fast, c ean — Flick of switch on control panel instantly activates point-of-action electric-hoist motor. Body raises quickly, to desired angle. At full dump position, edge of bowl is low behind rear wheels... material cannot roll forward to lodge against wheels, nor pile under rear end. Streamlined body sheds stickiest material readily.

Resists body shock, damage — Shovel operator does not have to take it slow and easy when loading. Rear-Dump body is ruggedly built. Simplicity of Tournapull Rear-Dump construction permits using steel otherwise used in frame and sub-frame. In L-W Rear-Dumps this material is used to build greater strength into the bowl itself. Body is all steel — no wood fillers. Floor is lined with heat-treated tool-steel strips, welded to solid billets laid over heavy steel plate.

Ask for complete information

If you're interested in increased production and lower handling costs, it will pay you to investigate high-production Tournapull Rear-Dumps. 3 sizes: 11, 22, and 35 tons. Write for full specifications.

Tournapull—Trademark Reg. U.S. Pat. Off. R-1452-M-1

Big single, low-pressure tires... exclusive power-transfer differential... and 90° electric wagon-type power steer enables Rear-Dump to safely and steadily haul through muck, rock, and soft fill.

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

FOR 50 YEARS...
Finest in the Field!
Contractors know and decide on Omaha Dragline Buckets for every use. They base their opinion on three important points:
• Lower First Cost
• Lower Operating Cost
• Lower Repair Cost
Strike pay dirt now!
Complete information and specifications await your letter.
DRAKE-WILLIAMS MOUNT
• OMAHA, NEBR.
OMAHA
DRAGLINE BUCKETS

New Trade Literature

Subject: **Wire Rope Abrasion**

Content: A two-page illustrated bulletin entitled *Abrasion* describes the principal causes of this most common and destructive enemy of wire rope and lists numerous practical suggestions for minimizing its effects. It is the first of a new series of Leschen Wire Rope bulletins which provide easy-to-read information bearing on common wire rope problems and their best solution. Ask for bulletin No. 101.

Where to get: Leschen Wire Rope Div., H. K. Porter Co., Inc., 2727 Hamilton Ave., St. Louis 12, Mo.

Subject: **Air Tools**

Content: An 8-page bulletin titled *I Know Airpower* discusses troubles encountered, causes, and remedies when using rock drills. In addition to a rock drill "trouble-shooting chart," two pages of the bulletin are devoted to growing usage of air as power. Pictures and drawings illustrate construction and maintenance of various air tools. Ask for bulletin AT-116B.

Where to get: Sales Promotion Dept., Le Roi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.

Subject: **Caterpillar Products**

Content: Caterpillar has released three new booklets on its products. *Wanted: Hard Work* contains on-the-spot photographs of earthmoving equipment at work on rugged jobs in various industries. Caterpillar machines are shown at work on cliff sides, in mines and in swamps. Ask for form D709. The subject of the booklet, *Cat Lowbowl Scrapers Keep Costs Low*, is the reduction of earthmoving costs through the use of modern equipment. Ask for form D717. *Representative Owners of Caterpillar V-8 and V-12 Diesels* tells where, how and by whom the diesels are being used. The booklet lists the manufacturers who offer Cat engines to power their equipment. Ask for form 32321.

Where to get: Advertising Div., Caterpillar Tractor Co., Peoria, Ill.

Subject: **1-Yd. Excavator**

Content: A 20-page catalog features a new, heavy-duty 1-yd. Bay City excavator with 25-ton capacity as a crawler crane. Some typical pictures include cut-a-way views of lower base assemblies, speed reducing units and tandem drums with booster-operated clutches.

Where to get: Bay City Shovels, Inc., Bay City, Mich.

Subject: **International Truck History**

Content: International has produced *50 Years of International Trucks, 1907-1957*, which traces the progress of truck manufacture from the first high-wheeled, 20-hp "IHC Auto Wagon" built in 1907 down to the present-day International operation. The brochure includes a chart which shows the decade-by-decade increase of International production. Ask for form CR-317-G. International also has produced new catalogs on its lines of 6 and 4-cylinder carbureted power units. A 12-page catalog, CR-511-G, devotes a page of space to each of the six recently-introduced units in the 6-cylinder line. The units are attractively presented with handy power and fuel consumption curves. Cutaway views of components are presented. Brief specifications of the units are listed, disclosing performances on gasoline, LPG or natural gas. Catalog CR-510-G provides space for data on each of the four heavy-duty units in the 4-cylinder line.

Where to get: International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

New Movies . . .

Subject: **Welding Processes**

Content: A 20-minute sound-color Linde film shows a variety of welding processes and applications, and treats them in a generally non-technical manner. The film points out the many factors involved in electric welding and how research, development and engineering serve to provide increasingly better methods and equipment.

Where to get: Linde Co., Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.

Broad, low-pressure tires "float" Tournapull ("C" size shown) over soft going. Deep lugs give ample traction. With self-cleaning tread design, natural running action forces mud and dirt toward edges of tire. This, plus constant tire flexing, keeps tread clean for efficient traction under all conditions.

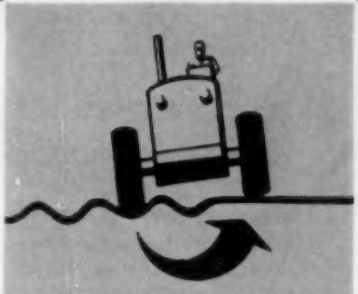
How to beat bad weather ...tough job conditions

It's no accident that LeTourneau - Westinghouse Tournapull® scrapers haul more dirt — lose less time because of bad footing and other adverse working conditions — than any comparable rubber-tired scraper combination. Sand ... soft cuts and fills ... even wet, muddy going fails to bog-down Tournapull scraper combinations. Here's why:

POWER-TRANSFER DIFFERENTIAL

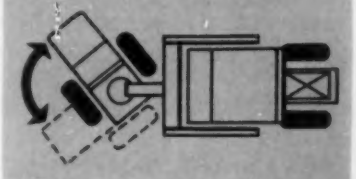
Major reason for Tournapull's success in moving impressive yardages in all working conditions is its patented, automatic, power-transfer differential. It maintains effective pulling-power on both drive-wheels — regardless of footing. When one wheel begins to spin, differential automatically transfers up to 4 times its tractive effort to drive wheel on firmer footing. Neither wheel will spin independently until the 4-to-1 ratio is exceeded.

Exclusive L-W differential works *continuously* — on turns, through mud and slippery footing, over rough, uneven ground. This gives you better traction throughout any haul cycle ... for faster, easier, more profitable dirtmoving.



ELECTRIC KINGPIN POWER-STEER

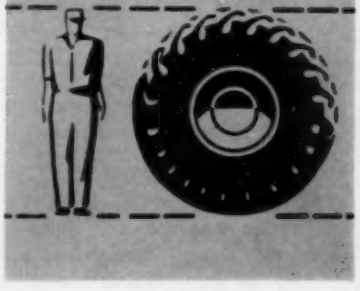
Where footing is very bad, positive electric kingpin power-steer adds to Tournapull's tractive power. Operator just flicks dashboard steering switch left, right, left, right. This pivots prime-mover from side-to-side ... "walks" drive-wheels onto solid footing. Kingpin steer also permits operator to make continuous 180° turns in space less than unit's length ... permits working in restricted areas.



BIG, LOW-PRESSURE TIRES

Big, single, low-pressure tires give *extra-flotation* to carry Tournapulls through soft going. Tire "floats" ... stays on top of the ground instead of digging in.

In addition, tires provide firm, *positive traction*. Lug height on tire is great enough, and the distance between cleats wide enough, to permit a big bite. Operation at low-pressures permits more of the tread to grip the ground in soft sand or mud. Tournapull tires get a good firm grip, but do not dig in.



Get complete facts

For more work days in "shut-down" weather, it will pay you to investigate the popular easy-loading 27-yd. B Fullpak*, 18-yd. C Fullpak, or 9-yd. "D" handyman. Call or write for complete details and owner-verified production figures. No obligation.

*Trademark P-1464-DC-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Notes from the Manufacturers

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has broken ground for a $3,250,000 engineering and research laboratory at its Harvey (Ill.) works. The building is being constructed on a portion of the 35 acres the company purchased in the city of Phoenix, which is located just east of the Harvey works plant No. 2. The program represents a major expansion of Harvey works engineering facilities. It will provide a central engineering building, an engine and material handling product development laboratory and an engine test wing accommodating 32 engine dynamometers. The project also will include an experimental machine shop, a metallurgical laboratory and a proving ground for material handling equipment. H. K. Ferguson Co., Cleveland, Ohio, is architect and general contractor for the project.

Bucyrus-Erie Co., South Milwaukee, Wis., has promoted Robert P. Brooks to assistant sales manager, large machines and blast hole drills. Brooks, formerly Northwestern sales manager at Seattle, Wash., will work out of the South Milwaukee office. A mining engineering graduate of Pennslyvania State College in 1942, Brooks spent the next four years in the Army. He joined Bucyrus-Erie in 1946 under a special apprenticeship. Later he was assigned to Seattle as a sales representative. He became Northwestern sales manager in 1954. His stay at Seattle was interrupted for two years during the Korean war, when he was recalled to active military duty as an operations and training school officer at Sixth Army headquarters. Bucyrus-Erie has also appointed William R. Stone as a small excavator sales representative. He will work out of the company's Chicago (Ill.) office. Prior to joining Bucyrus-Erie, Stone worked as a sales engineer for Theo. H. Davies and Co., Ltd., Honolulu, Hawaii.

Caterpillar Tractor Co., Peoria, Ill., has begun construction of a 50,000-sq. ft. industrial engine plant located 12 miles north of Peoria. A multi-building research center and a general offices building are slated for future construction. The new industrial engine plant will be completed by early 1959. Caterpillar's two largest engine models, the D397 and the D375, will be manufactured there. In addition, the plant will be the assembly point for industrial engine arrangements of other engines in the Caterpillar line. Design and manufacture of all special industrial engine attachments also will be carried on there. Manufacture of the remainder of the Cat engine line will continue at the Peoria plant. Work on the three new facilities will be the major part of Caterpillar's current building program, total cost of which will be approximately $200 million for the next three years.

Ellicott Machine Corp., Baltimore, Md., has acquired the floating dredge

Continued on page 78

A Proved Way to Speed Output... Bucyrus-Erie Dragline Buckets

Designed for Profitable Production A new-design Bucyrus-Erie dragline bucket helps deliver profitable production. The accurate balance of the bucket provides quick dig-in — so do properly pitched teeth, cutting edge and thin "slicing-action" lip. Tapered basket fills rapidly. Proper flare and balance reduce bobbing and spillage. High arch and smooth interior help bucket dump clean and fast.

For Long-Life Service

The use of BECOLOY cuts down the weight of buckets, yet makes them extra tough. BECOLOY has a fibrous structure which assures exceptional resistance to impact and shock. Field maintenance is simplified since the alloy can be cut with an acetylene torch and welded without special procedures.

A Size and Type for Every Job

New-design Bucyrus-Erie buckets are available in a wide range of sizes with solid or perforated baskets, in light, medium or heavy-duty types. Call your Bucyrus-Erie distributor for complete information on these buckets that outperform older designs.

27R57C

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

Speed grader servicing

...simplify parts inventory

Take YOUR choice of field-proven Cummins or GM engines ...match grader power to YOUR service set-up

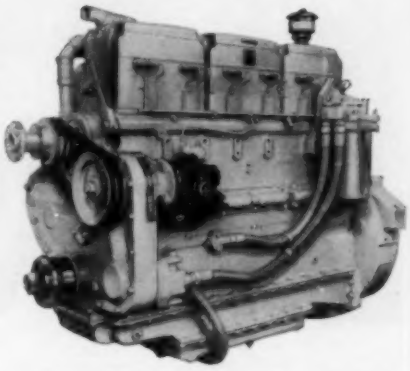
You may find that the *make* of diesel engine you specify in your grader can save you hours — maybe days — of production downtime. It may even save you considerable maintenance expense.

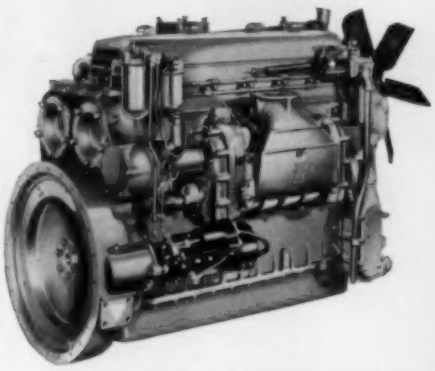
That's why, when you buy a heavy-duty Adams* grader, you get your choice of the two most popular, most-used engines in the construction industry. You're not limited to just one. You aren't forced to take an engine that the grader manufacturer builds . . . or has arbitrarily selected for his "standard". You set YOUR OWN standard.

Choose the engine that's better for you

For any 80 to 190 hp Adams grader, you may specify either field-proven engine . . . Cummins or General Motors diesel . . . pick whichever power-plant you find better for your particular operation and locale. This lets you standardize your fleet on one make or the other . . . reduce size and cost of your repair parts inventory. You can pick the engine your mechanics find easier to service . . . one your operators like better . . . or a unit that has given you good service in the past. For whatever reasons, *the choice is yours.*

Call or write for details on this — and many other features — offered only on cost-cutting Adams graders.





Whichever diesel you select for your Adams grader, you can be sure it affords plenty of usable horsepower . . . all the high work-producing torque you'll ever need. You can grade all-day-long at full throttle, without exceeding safe limits. You'll work long periods without repairs — without downtime — because Adams engines are of ample-size . . . selected for heaviest-duty dirtmoving. Before you buy any grader, compare engine specifications and torque ratings.

Model	660 POWER-Flow* (Torque-converter)	660	550	440	330	220
Usual Working Weight (pounds)	30,200	30,050	26,370	24,080	23,020	15,500
Choice of Engines	General Motors 6-71 190 hp @ 2000 rpm (or) Cummins HRFBI-600 190 hp @ 2000 rpm	General Motors 6-71 150 hp @ 1800 rpm (or) Cummins HBI-600 150 hp @ 1800 rpm	General Motors 4-71 123 hp @ 1800 rpm (or) Cummins NHCBI-400 123 hp @ 1800 rpm	General Motors 4-71 115 hp @ 1800 rpm (or) Cummins NHCBI-400 115 hp @ 1800 rpm	General Motors 3-71 80 hp @ 1800 rpm (or) Cummins J-6-BI 80 hp @ 1800 rpm	General Motors 4-51 60 hp @ 1800 rpm No Option

*Trademark G-1374-G-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

BEAUTY...OR BEAST?

We'd be the last to claim that Amsco® Dippers have any inherent glamour. That's why we induced the pert 115-pound* blond to pose in one of our 7-yd. dippers at a recent trade show. Got a lot of attention, too!

But we know that experienced operators *specify* these all-cast Manganese Steel Dippers because they're real "beasts"—when it comes to strength and ruggedness. By way of proof, glance at the other photo. It shows a 9-yd. Amsco Dipper hoisting a 60 to 70-ton* rock out of the St. Lawrence Seaway Channel. There's plenty more proof available, too—on the extra strength, digging ability and long life of Amsco Dippers. That's why they're the number one original-equipment choice on most leading makes of power shovels!

Consult your equipment manufacturer, or write us direct for new booklet on *Amsco Power Shovel Equipment*, giving detailed reasons why Amsco Dippers are real "beasts" when it comes to rugged digging work.

*Estimated

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

Bucyrus-Erie 200-W diesel dragline shipped in 1950; 125 ft. boom, 6 yd. heavy duty and 7 yd. light weight buckets; some spare parts included; good mechanical condition. Location Melbourne, Australia. Box 3682

Bucyrus-Erie Model 5-W Diesel dragline, 100' boom, 25' insert extension. Fairbanks-Morse main engine, auxiliary 100 HP Cummins for swing generator, includes two (2) Esco buckets, one five yard and one six yard. Owner using machine and can be inspected in actual operation, very good operating condition, located in Northern Illinois. Price including buckets and approximately $5000 worth of spares. $60,000 as is. Box 3716

2-W Monighan Walking-Type Dragline #492, 85' boom, 2-year old D-13000 Caterpillar diesel engine #4S685, 2-yard Hendrix bucket, 2½ yard Page bucket, some spare parts, fair operating condition. Box 3708

Bucyrus-Erie 120-B dragline, 100' boom with gantry mast, 4' tracks, A-1 condition, located northern California.

THURMAN & WRIGHT
625 Market Street San Francisco, Calif.

SMALL SHOVELS, CRANES, DRAGLINES—UP TO 2½ YDS.

Bucyrus-Erie 22-B, ¾-yd. dragline, Serial #80492 (1950), with 40' boom; extra counterweight and Cat D318 diesel engine with electric start.
F.O.B. Denver, Colo. $13,500
Link-Belt K-360 1½-yd. shovel and dragline. Serial #1985 (1940), with 55' boom, 1½-yd. Page bucket, Cat D13000 diesel engine, 1½-kw light plant, extra cwt. and spare parts.
F.O.B. Casper, Wyo. $16,500
Lima Model 604, 1½-yd. shovel, Serial #324171 (1949), with 33" wide treads, powered by Cummins Model H1S diesel engine.
F.O.B. Casper, Wyo. $29,500
Shield-Bantam Model M-49, ¾-yd. shovel and hoe; Serial #3349 (1952), powered by LeRoi gas engine, mounted on GMC (Army surplus) 6x6 truck.
F.O.B. Denver, Colo. ..... $ 4,500
Backhoe front for Lorain TL-25, ¾-yd. Amsco dipper.
F.O.B. Denver, Colo. ..... $ 1,850
Shovel front for Lorain L-80, 1¼-yd. Amsco dipper.
F.O.B. Denver, Colo. ..... $ 3,250

THE COLORADO BUILDERS' SUPPLY COMPANY
1534 Blake Street WEst 5-3571
Denver 2, Colorado

Bucyrus-Erie 10-B dragshovel, serial no. 72520, ⅜-cu. yd., Buda gasoline, electric starter, in excellent working condition: $6250.

Link-Belt heavy duty dragshovel, Model LS-85, ¾-yd., powered by Cat D8800, this machine recently gone over in our shop, ready to work.

Lorain shovel front for Model TL-20, ½-yd.

Lorain backhoe front with bucket for Model TL-20, ½-yd.

Link-Belt shovel front for Model LS-40, ½-yd.

Koehring shovel front for Model 303, ¾-yd.

BEMISS EQUIPMENT CORPORATION
2219 Chamberlayne Ave. Richmond 22, Va.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

38-B BUCYRUS-ERIE 1½-Yd. DIESEL SHOVEL, GMC-671 engine, torque converter; located at Seattle.
22-B BUCYRUS-ERIE DIESEL SHOVEL, Cat D318 engine, electric starter; located at Seattle.
25 NORTHWEST DIESEL SHOVEL, long tracks, Murphy engine, 2-speed travel; located near Seattle.
25 NORTHWEST DIESEL HOE, GMC3-71 engine; located at Seattle.

CLYDE EQUIPMENT COMPANY
3410—1st Ave. South Seattle, Washington
Phone MAin 1235

H-3 Hydrocrane, Serial #97025; converted to self-powered, w/6-cyl. LeRoi gas engine, w/elec. starter and batteries. Selector valves and foot controls installed. Std. length crane. Clamshell eq. incl. 2-ram bucket dragshovel eq. Carrier; 6x6 GMC w/Tulsa winch (front mtd.). Good working condition. Price: $8000 net. Write: West Coast Engine & Equipment Co., 1081 Eastshore Highway, Berkeley, Calif.

H-3 Hydrocrane-Hoe, serial #108671, GMC 352-24 truck, 2-speed rear axle and no-spin differential lock. Price: Crane only, $9000; crane and hoe, $10,500. 1st class operating condition. Write: Mr. R. F. "Joe" Phillips, Richardson Tractor Co., P. O. Box 330, Clarksburg, W. Va.

H-3 Hydrocrane, serial #97026, with 29" magnet. International L-162 truck serial #63731. Price: Less generator and magnet eq. $8000; including generator and magnet eq. $10,500. Write: Browning-Ferris Machinery Co., Mr. R. H. Siler, P. O. Box 7966, Dallas 26, Texas.

2-Yd. MODEL 820 LORAIN CRAWLER CRANE-SHOVEL COMBINATION; equipped with Cat D13000 diesel engine, standard crawlers, 70' boom, fairlead, maximum counterweight, new boom and like-new shovel attachment. Good condition; located at Milwaukee; available immediately.
1½-Yd. KOEHRING MODEL 605 CRANE-HOE COMBINATION; Cat D-13000 diesel engine, 60' boom, new hoe attachment. Excellent condition. Call for location to inspect.
1¼-Yd. MODEL 33-B BUCYRUS-ERIE ERECTION CRANE with 100' boom and jib, independent boom hoist, gas power. Very good condition; will be available late in June. Priced right for a big machine.
1-Yd. MODEL LS-90 LINK-BELT SHOVEL, Waukesha gas power; entire unit in like-new condition. Priced at about half of new replacement cost.
¾-Yd. MODEL 34 LIMA DRAGSHOVEL, equipped with Cummins diesel engine, good running condition, priced to sell.
½-Yd. UNIT CRAWLER-MOUNTED DRAGSHOVEL, equipped with Chrysler Industrial gas engine. Fair condition and priced to sell. See at our yard.
SHOVEL ATTACHMENT for Model 22-B Bucyrus-Erie excavator, excellent condition, available at once, priced to sell.

J. P. WAITE INC. Phone: EVergreen 4-1900
3301 West Pierce St. P. O. Box 313
Milwaukee 1, Wisconsin

P&H 1055 diesel shovel with 28' boom, Marion 492 sticks and 2½-yd. dipper; Buda diesel engine; quantity of spare parts available at half price. Price f.o.b. Hyde Park, Vt.: $17,500. The Ruberoid Co., Hyde Park, Vt.

SMALL SHOVELS, CRANES, DRAGLINES — UP to 2½ YDS.

FOR SALE
CONSTRUCTION EQUIPMENT

1055 P&H Drag, 80', 3½ yard
1201 Lima Dragline, 85', 3 yd.
40-A Marion Drag, 90', 2½ yd.
955 P&H Dragline, 90', 2½ yd.
54-B Bucyrus-Erie Drag, 85', 2½ yd.
3500 Manitowoc Drag, 85', 2½ yd.
95 Northwest Drag, 80' boom
903 Osgood Dragline, 70', 2 yd.
802 & 604 Lima Cranes
43-B Bucyrus-Erie Drag, 70', 1¾ yd.
1055 P&H 3½ yd. Standard Shovel
1201 Lima 3½ yd. Standard Shovel
955 P&H 2½ yd. Standard Shovel
80-D Northwest 2½ yd. Standard Shovel
802 Lima Comb. H.L. Shovel—Drag
51-B Bucyrus-Erie 2-yard Shovel
38-B Bucyrus-Erie 1½ yd. Shovel-Crane
37-B Bucyrus-Erie 1½ yard Shovel
6 Northwest 1½ yd. Shovel
44 Lima 1 yard Backhoe
25 Northwest Comb. Shovel-Drag
Unit 1020 ¾ yard Shovel
22-B Bucyrus-Erie Backhoe
15-B Bucyrus-Erie Backhoe
255 P&H Truck Cranes
424 Lorain Truck Crane
22-B Bucyrus-Erie Truck Crane
LC-90 Link Belt Speeder Truck Crane
TL-20 Lorain Truck Crane
Euclid Trucks—Bottom & Rear Dump
600 Reich Heavy Truck Mounted Rotary Air Drills
58-BH Joy Champion Rotary Air Drills
42-T, 29-T & 27-T Well Drills
Davey Rotary Truck Air Drills
Mayhew Rotary Truck Air Drills
Garwood, LeTourneau, Caterpillar, Euclid & Bucyrus-Erie Scrapers
Caterpillar & Allis-Chalmers Dozers, Front End Loaders, Graders
International Bulldozers
Shovel, Drag, Crane & Backhoe Attach. Drag & Dipper Buckets for most makes and models.

FRANK SWABB
EQUIPMENT CO., INC.

313 Hazleton Nat'l. Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

Model H-3, ⅜-yd. clamshell bucket, tagline reel, like new. Price: $950. Write: H. B. Park, Jr. IMC Equipment, Inc., 720 Spring St. NW, Atlanta 8, Ga.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

One Bucyrus-Erie Model 41-B, 3 motor AC electric shovel, serial no. 10796, 1½-yd. dipper, cat-mounted, 26" treads; 22'6" boom, 15' handle; good operating condition. Many replacement parts for swing and crowd machinery recently installed or available. Located Mid-West.

One Bucyrus-Erie Model 52-B, Ward-Leonard electric shovel, serial no. 11395, equipped for 3 phase, 60 cycle, 440 volt operation; 2¼ cubic yard dipper, 30' boom, 18' handle; equipped with power boom hoist and electric light plant. Well maintained and in good operating condition. Caterpillar units recently overhauled. Located Mid-West. Box 3710

Northwest Model 95, serial #14294-11394C; Model 21 Murphy diesel, serial #15593; 80' boom crane/dragline revolving fairlead; folding gantry; 2-yd. capacity; holding line—⅞" x 190'; closing line—⅞" x 215'; tag line—⅝" x 100'; 38" wide tracks.

Northwest Model 95, serial #14405-11692C; Model 21 Murphy diesel, serial #MD10772; 80' boom crane/dragline; folding gantry; 2-yd. capacity; holding line—⅞" x 190'; closing line—⅞" x 215'; tag line—⅝" x 100'; 38" wide tracks. Box 3722

Koehring model 303 heavy duty ¾-cu. yd. dragshovel, standard crawlers, Waukesha gasoline engine.
Michigan T6-K ¾-cu. yd. truck crane and clamshell, gasoline engine, ⅜-yd. backhoe attachment, ¾-yd. clamshell bucket.
Oliver 88 rubber tired tractor with ¾-cu. yd. hydraulic front end loader.
Osgood 4-wheel 12-ton pneumatic tired full trailer.
Vermeer 24-T trencher with Wisconsin 4-cylinder gasoline engine, 24" cutters, 6' depth.
Pettibone 175-D, 2-cu. yd., 4-wheel drive, planetary gear loader, 371 GM power, oversize tires —Demonstrator, excellent buy.
Ruhr .5 heavy duty grapple.
Wylie patchmobile—demonstrator.
LeRoi 105 compressor, gasoline, 2 pneumatic tires.

S. M. CHRISTHILF & SON, INC.
Timonium, Maryland **VAlley 5-5100**

There's Something

NEW

Coming From

BUCYRUS ERIE

NEXT MONTH!

438E57e

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Model H-5, ½-yd. clamshell bucket, tagline reel. Price: Clamshell, $900; tagline, $350. Write: Euclid Sales & Service, Inc., Mr. F. M. Sheldon, 5231 Manchester Ave., St. Louis 10, Mo.

Koehring model 304, ¾-yd. backhoe, on crawlers; powered by International UD-14 diesel engine, 33" wide bucket, 5715-C. $10,500 f.o.b. Evansville, Ind.

Link-Belt speeder, ½-cu. yd. shovel on crawlers, powered by Buda 6-cylinder gasoline engine, good operating condition, 5724-C. $5,500 f.o.b. Louisville, Ky.

Unit ¾-yd. shovel, mounted on crawlers, powered by Chrysler C-36 gasoline engine, 3717-C. $4,000 f.o.b. Mt. Vernon, Ill.

Link-Belt model LS-50 ½-yd. dragline clamshell combination, also backhoe attachment, mounted on crawlers, powered by gasoline engine, 5718-C. $8,500 f.o.b. Mt. Vernon, Ill.

"Quick-Way" model L, ½-cu. yd. shovel and crane, 35' boom, powered by International U9 gasoline engine, mounted on a White halt-track, excellent condition, 6219-B. $7,000 f.o.b. Louisville, Ky.

Shield Bantam model M-49, 4/10 cu. yd. capacity backhoe, powered by LeRoi D176 gasoline engine, mounted on a White half-track, powered by 6-cylinder gasoline engine, 5712-B. $7,000 f.o.b. Louisville, Ky.

BRANDEIS MACHINERY & SUPPLY CO.
Jim Waddell, P.O. Box 1705, Louisville 1, Ky. Phone: MElrose 7-4741.
L. L. Freeman, P.O. Box 27, Evansville, Ind. Phone: HArrison 3-4491.

Bucyrus-Erie 15-B dragline excavator with 30' boom, Cat diesel engine with electric starter, Unit 76 tractor-type crawler mounting with 20" wide grousers, Unit 79c counterweight. Machine serial #115288; has been used 650 hours.
Price f.o.b. Greensboro, N. C. $18,500
Northwest 25 shovel front with ¾-yd. dipper. Price f.o.b. Greensboro, N. C. $1,500
Northwest 25 combination dragline, clamshell shovel with Murphy diesel engine, serial #14716.
Price f.o.b. Greensboro, N. C. $14,000

E. F. CRAVEN COMPANY
Greensboro, North Carolina

LORAIN MOTO-CRANE Model L41, 20-ton capacity, 30' boom, outriggers and screw jacks; mounted on standard factory carrier, 11:00x 20—12 ply tires. Good operating condition.. $18,000.

LIMA Model 802, 2-yd. Shovel, with 36" pads, air controls, powered by a Cat D17000 diesel engine, with electric starter. Reconditioned tops $32,500

LIMA Paymaster Truck Crane, Type E34, ¾-yd., 35' boom, powered by 6-cylinder Buda gas engine; mounted on Brockway 6x6 truck carrier with ten 12:00x24 tires. Reconditioned $13,000

BUCYRUS-ERIE Model 15-B Dragshovel, ½-yd. powered by a Waukesha model HP526 gasoline engine with electric starter. Good condition $7,000

Subject to inspection & Prior Sale

H. O. PENN MACHINERY CO, INC.
140th St. & E. River **CYpress 2-4800**
New York 51, New York

MISCELLANEOUS EQUIPMENT

FORD MODEL JD-1025 GASOLINE ENGINE with radiator-flywheel, ring gear and starter. $200.

***ALL PRICES—**
F.O.B. SOUTH MILWAUKEE, WISCONSIN
BUCYRUS-ERIE COMPANY
South Milwaukee, Wis.

Two Model 29-T Churn Drills, crawler mounted, electric powered. Price f.o.b. Hyde Park, Vt.: $5,000 each.
Two Model 27-T Churn Drills, crawler mounted, electric powered. Price f.o.b. Hyde Park, Vt.: $2,500 each.
One Bucyrus-Erie #12 Bit Dresser. Price f.o.b. Hyde Park, Vt.: $2,500. THE RUBEROID CO., Hyde Park, Vt.

MISCELLANEOUS EQUIPMENT

Dipper dredge, 4-yd., steam, steel, working.
Hydraulic dredge, 18"x16", steel, steam.
Plymouth 25-ton gas locomotive, std. ga.
Whitcomb-Baldwin 65-ton diesel locos. (2)
Baldwin-Westinghouse 140-ton diesel-electrics.
Bucyrus 9-W, and Page 625 diesel walking drgls.
Pelton 2000 hp hydro-elec. generators (2), 160' head.
Diesel engines, marine and w/generators, 1000-1800 hp.
Colby 15-ton hammerhead crane, 75' high, 300' span.
4000 KW floating power plant ship, 2300 v.
Power shovels, cranes, derricks; Euclids (19)
Gold placer dredges, 4½' (Africa) 12', 16'.

H. Y. SMITH COMPANY
828 N. Broadway **Milwaukee 2, Wisconsin**

2—Model 27-T blast hole drills, gasoline powered, crawler mounted, complete with tools and lines.
1—#8 Bit dresser equipped to dress 7" bits.
BEN TULLY & SONS, Poyntelle, Pa. Phone Pleasant Mount 2658.

Bucyrus-Erie 10B shovel front complete with bucket; like new condition. Price can not be beat at $175; worth $500. Truck tandem assembly $125. 1625 E. Kearney, Springfield, Mo.

Model 27-T blast hole drill, serial No. 18269, Waukesha gasoline power, crawler-mounted, 33' one-piece all-steel derrick complete with tools in good working order. Located in Missouri. Priced to sell. Box 3718

Model 27-T blast hole drill, serial No. 19628, Waukesha gasoline power, crawler-mounted, 33' one-piece all-steel derrick complete with tools in good working order. Located in Missouri. Priced to sell. Box 3719

ONE—2¼-YD. COAL LOADING DIPPER, NEW FOR 38-B. LOCATED NEAR PITTSBURGH. $2500.
BOX 3720

FOR RENT

Available immediately — Bucyrus-Erie Model 51-B dragline clamshell lifting crane—100' boom, 20' jib, long and wide treads. Independently propelled. For rent by week or month.

BRANDEIS MACHINERY & SUPPLY CO.
P. O. Box 1705 **MElrose 7-4741**
Louisville 1, Kentucky

Notes . . .

Continued from page 74

business of Bucyrus-Erie Co., South Milwaukee, Wis. The acquisition includes all manufacturing rights, drawings, engineering data and patterns. Ellicott is prepared to supply repair and replacement parts for all dredges built by Bucyrus-Erie. Such parts will be strictly in accordance with the original design and specifications. Ellicott was established in 1885 and has specialized in the design and manufacture of dredges, especially dredges for river and harbor improvement, canals and waterways, waterfront filling, real estate improvement and for the production of sand, gravel and shell. Bucyrus-Erie dredges have been used for the recovery of tin, gold and platinum, as well as for river and harbor improvements.

NEW "KING-SIZE" CARTRIDGES SAVE TIME AND LABOR

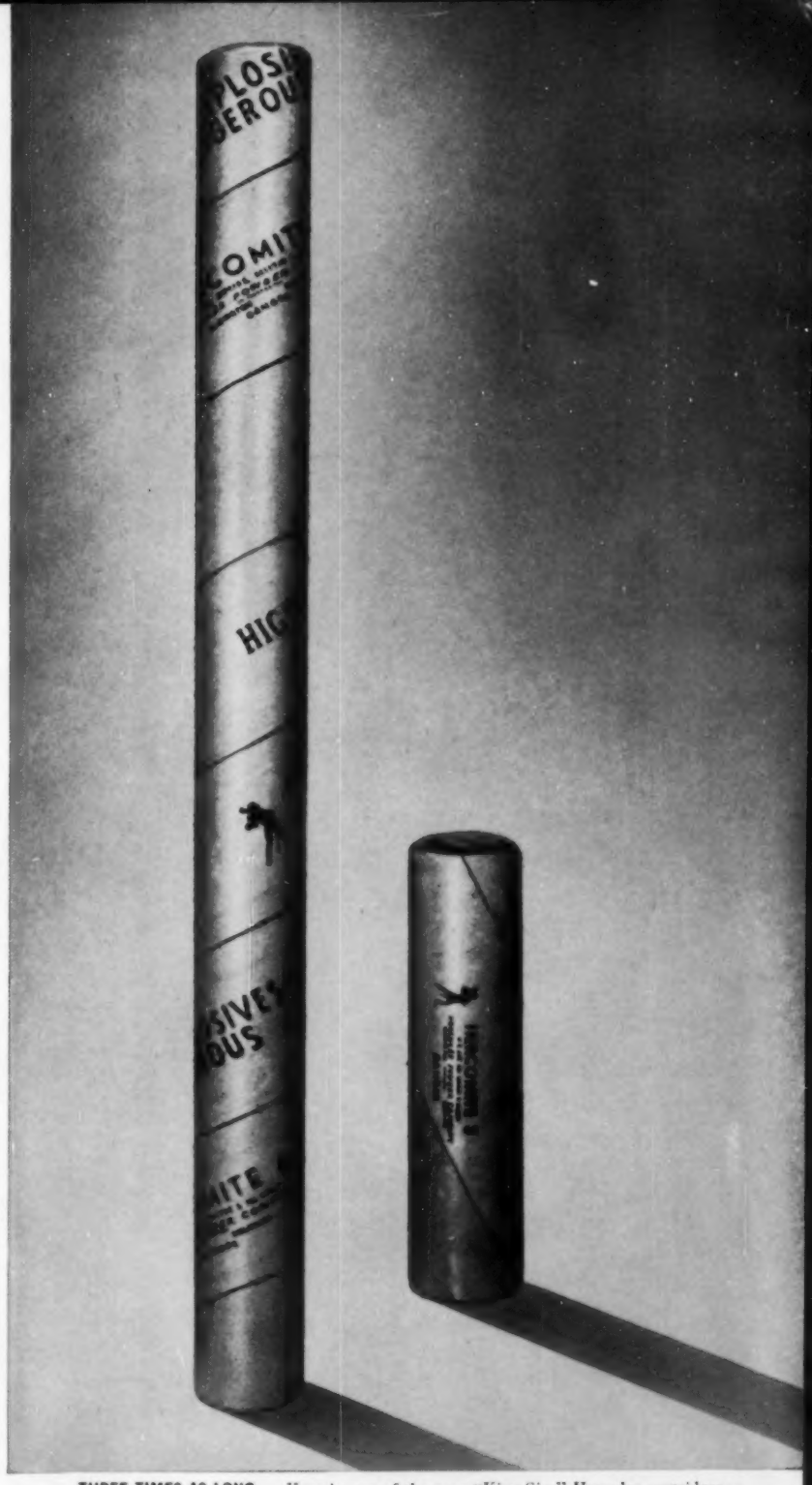
Now, Hercules produces "King-Size" cartridges in lengths of 24, 20, 16 and 12 inches, and in diameters of 1¼, 1½, 1¾, and 2 inches.

Available in all types of Hercules® dynamite, these long-length, small-diameter cartridges are now in full production.

"King-Size" cartridges make possible a more uniform fragmentation through the discharge of a single column of explosive. Their use means substantial savings in valuable time and labor in loading holes.

Hercules designed, tested, and installed special new packing machines for these "King-Size" cartridges.

Our technical service and sales representatives will be glad to discuss with you how these "King-Size" cartridges can go to work for you.



THREE TIMES AS LONG... Here is one of the new "King-Size" Hercules cartridges—24 inches in length, shown alongside the same grade in the conventional 8 inch size.

HERCULES

HERCULES POWDER COMPANY

INCORPORATED

Explosives Department, 900 Market St., Wilmington, Del.

Birmingham, Ala.; Chicago, Ill.; Duluth, Minn.; Hazleton, Pa.; Joplin, Mo.; Los Angeles, Cal.; New York, N.Y.; Pittsburgh, Pa.; Salt Lake City, Utah; San Francisco, Cal.

THE CASE OF

THE OWNER WHO THOUGHT AHEAD

ART, THIS CAT* CARE SCHOOL SHOULD PAY OFF WHEN WE START ROLLING NEXT SPRING!

CAT

-AND SPEAKING OF SPRING, I'M GOING TO NEED SOME SERVICE WORK ON MY MACHINES TO BE SURE THEY'RE READY.

NOW'S THE TIME TO THINK OF THAT, TOM!

SUPPOSE WE MAKE UP A SCHEDULE FOR WINTER SERVICING OF YOUR EQUIPMENT. THAT WAY WE'LL GET THE MACHINES BACK ON THE JOB FASTER-MAKING MONEY FOR YOU.

NSON
RUCTION CO.

CATERPILLAR

SWELL! LET'S START WITH MY D6 ON MONDAY. WE'LL BRING IN THE OTHER EQUIPMENT ON A SCHEDULE AFTER THAT.

MONDAY'S FINE! NOW, LET'S MAKE A LIST OF JUST WHAT NEEDS TO BE DONE...

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

CAT CARE FOR LONGER WEAR

LET ME SCHEDULE YOUR WINTER SERVICE NEEDS FOR YOU!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.